

ON EUROPEAN PTEROMALIDAE
(HYMENOPTERA):

A REVISION OF *CLEONYMUS*, *EUNOTUS* AND
SPANIOPUS, WITH DESCRIPTIONS OF NEW
GENERA AND SPECIES

BY

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ON EUROPEAN PTEROMALIDAE (HYMENOPTERA): A REVISION OF *CLEONYMUS*, *EUNOTUS* AND *SPANIOPUS*, WITH DESCRIPTIONS OF NEW GENERA AND SPECIES

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SYNOPSIS

This paper supplements Graham's recent work (1969) in revising the European species of several genera of Pteromalidae and giving descriptions of new taxa. Most of the 14 new species are from central and southern Europe. In *Cleonymus* three species are recognized including two new ones, in *Eunotus* nine species (two new), in *Spaniopus* seven species (two new). Also described are five new species belonging to four new genera, one of them in the subfamily Miscogasterinae, the other three in the Pteromalinae. In *Peridesmia* one new species is added to the two previously known; similarly one species is described in *Semiotellus* and one in *Pteromalus*. The study of extensive fresh material and of the relevant types results in better recognition of some species and in the establishment of four new specific synonyms.

INTRODUCTION

THE magnificent and most useful monograph of the Pteromalidae of north-western Europe by Graham (1969) covers the Pteromalid fauna of Europe to a greater extent than its title would suggest. Where possible, it provides keys to the European genera and species.

In some groups, apparently, most species have already been described but in some other groups information is still very incomplete. It is mainly in the latter groups that rich material has been collected together and the present contribution is the result of its study. This paper may therefore be regarded as a supplement to Graham's work.

The taxa are classified in the same way and described mainly in the same form. The morphological terms are also used mainly in the same sense as Graham, except for the following.

Prepectus is used instead of *postspiracular sclerite*, for in the more primitive Chalcidoids it forms an unbroken belt in front of the mesopleurae, so that 'postspiracular sclerite', pointing to an independent sclerite on each side of the thorax (as it occurs generally in more apomorph forms) does not seem quite as appropriate as the older term 'prepectus'.

The *mesopleura* of the thorax is divided by the oblique pleural line running from the base of the mid coxa towards the base of the fore wing (where it branches) into the anteroventral *mesepisternum* and posterodorsal *mesepimeron*. The mesepimeron is usually subdivided into the upper and lower epimeron. Graham calls only the lower part epimeron and considers the upper, frequently smooth part, as belonging to the mesepisternum, following Thomson.

The gastral *tergites* are counted, as Graham does in the text, i.e., the basal, postpetiolar tergite as the first, the spiracle-bearing tergite as the sixth.

The following abbreviations are used for depositories of the collections:

BMNH—British Museum (Natural History), London.

IEE, Madrid—Instituto Español de Entomología, Madrid, Spain.

MCSN, Genoa—Museo Civico di Storia Naturale, Genoa, Italy.

MHN, Geneva—Muséum d'Histoire Naturelle, Geneva, Switzerland.

MNHN, Paris—Muséum National d'Histoire Naturelle, Paris, France.

MNHU, Berlin—Museum für Naturkunde der Humboldt-Universität, Berlin, East Germany.

NM, Dublin—National Museum of Ireland, Dublin.

NM, Prague—Národní Museum, Prague, Czechoslovakia.

NM, Vienna—Naturhistorisches Museum, Vienna, Austria.

TM, Budapest—Természettudományi Múzeum, Budapest, Hungary.

USNM, Washington—U.S. National Museum, Washington, U.S.A.

UZI, Lund—Universitetets Zoologiska Institution, Lund, Sweden.

UZM, Copenhagen—Universitetets Zoologiske Museum, Copenhagen, Denmark.

ZI, Leningrad—Zoological Institute of the Academy of Sciences of the U.S.S.R., Leningrad.

ZIPF, Zagreb—Zoološki Institut Poljoprivrednog Fakulteta, Zagreb, Yugoslavia.

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CLEONYMINAE

CLEONYMUS Latreille

Cleonymus Latreille, 1809 : 29. Type-species: *Diplolepis depressa* (Fabricius); designated by Latreille, 1810.

The subsequent references are quoted by Graham (1969) and are not repeated here.

Kerrich & Graham (1957) and Graham (1969) recognize two European species, *C. laticornis* Walker and *C. obscurus* Walker. A study of further material revealed two new species in southern Europe and threw doubts on the validity of *C. obscurus*.

KEY TO EUROPEAN SPECIES

- 1 Frons in front of ocelli deeply regularly punctured, with narrow smooth interspaces between punctures (Text-fig. 4); vertex 1.36–1.48 times as broad as the relatively small eye. Fore wing in ♀ with hairs uniformly dark and long, even on the subhyaline spot below marginal vein (Text-fig. 2); infuscation of wing strong below postmarginal and stigmal vein but weak or absent below parastigma; marginal vein fully 1.9 times as long as the stigmal. Fifth tergite in ♀ in middle more than twice as long as the fourth and itself about 0.9 times as long as broad, coarsely raised-reticulate except along hind margin. Lateral ocellus about 1.6 times its diameter from eye margin. ♂ unknown. (Balkan Peninsula) . *balcanicus* sp. n. (p. 270)
- Frons sculpture different, either shagreened or rugulose; eyes usually larger, often as broad as the vertex. Fore wing in ♀ at least with some dense white hairs on hyaline spot below marginal vein, the latter at most 1.72 times as long as the stigmal. Fifth tergite in the middle at most 1.6 times as long as the fourth and itself at most 0.8 times as long as broad, its sculpture rather weak. Ocelli relatively larger, the lateral one at most about 1.15 its diameter from eye 2
- 2 ♀. Body stout, gaster at most about twice as long as broad (Text-fig. 5), distinctly broader than the thorax, only 0.9–1.16 times as long as head plus thorax combined. Head in dorsal view 2–2.15 times as broad as long, frons above shiny, shagreened (Text-fig. 9), piliferous punctures small. Scutellum usually transverse. Marginal vein less than 1.6 times as long as the stigmal. Fifth tergite at least twice as broad as long in the middle. ♂. Marginal vein hardly longer than the postmarginal, at most 1.5 times as long as the stigmal *brevis* sp. n. (p. 272)

- ♀. Body slender, gaster at least 2.4 times as long as broad, at most only slightly broader than (1.02–1.1, if flattened then at most 1.2 times as broad as) the thorax. Head in dorsal view at least 2.2 times as broad as long, frons in front of ocelli very densely irregularly rugulose, usually dull. Scutellum usually slightly elongate. Marginal vein at least 1.7 times as long as the stigmal. Fifth tergite less transverse. ♂. Marginal vein distinctly longer than the postmarginal and 1.8–1.9 times as long as the stigmal . *laticornis* Walker (and *obscurus* Walker) (p. 283)

Cleonymus balcanicus sp. n.

(Text-figs 1–4)

♀. Head and thorax mainly cupreous, in places sometimes with a weak bluish or greenish tint; propodeum and gaster bluish black or bronzy black, hind coxae dark green dorsally, bright cupreous laterally. Antennae and legs mainly dark rufous, but pedicel, first flagellar segment, preclava and clava more or less infusate; fore tibia sometimes externally with bluish tint, mid and hind tibiae dorsally more or less infusate; tarsi pale testaceous, infusate apically. Fore wing with an extensive brown cloud on disc extending to postmarginal vein and basad usually as far as below parastigma (Text-fig. 2); a small infuscation indicated also along hind margin in second quarter of wing. Hind wing subhyaline. Length 4.4–5.6 mm (the latter the holotype).

Head distinctly broader than mesoscutum (as 1.2–1.25 to 1), dorsally about 2.3–2.4 times as broad as long, with inner eye-margins slightly diverging forward. POL : OOL about as 1.7 to 1. Head in facial view (only head capsule measured, excluding mandibles) 1.42–1.44 times as broad as high. Ocelli relatively small, the lateral one more than 1.5 times its diameter from eye. Frons in front of ocelli simply reticulate-punctured, interspaces narrow but distinct, smooth (Text-fig. 4); face further down at sides with meshes more lengthened, slightly rugose-reticulate; the same in transverse sense on vertex behind ocelli; upper frons not distinctly angulately or sculpturally separated from the lower (more vertical) part, scrobes also not indicated. Relative measurements: head width 82, height 57, frons (minimum distance between eyes) 41, eye 36.5 : 30, malar space 23, mouth width 33, scapus length 24, flagellum plus pedicellus combined about 67. Antenna similar to that of *C. laticornis*, only slightly stouter, all segments between pedicel and clava moderately transverse (in *laticornis* fourth flagellar segment usually slightly longer than broad); pedicellus as long as two following segments combined, the first of them shorter than the second; processus of preclava broad and only about as long as the body of preclava.

Dorsum of thorax with relatively coarse, deep and fairly regular reticulation-punctuation and rather coarse but uniform whitish pubescence (as in *C. laticornis*). Scutellum about 1.1 times as long as broad, feebly convex, reticulation on its disc shallower than that on mesoscutum, axillar furrows anteriorly only moderately deep. Propodeum in the middle 0.45–0.5 times as long as scutellum, the median part superficially very weakly reticulate, much as in *laticornis*, but posterior flange laterad of nucha in dorsal view not quite as broad as the crenulate furrow basally at metanotal margin. Metapleura not very densely hairy. Mesepimeron in middle with deep fovea as a part of the curved groove separating the reticulate lower epimeron, the fovea not reaching metanotal margin; upper mesepimeron nearly smooth on disc but finely rugulose at sides, in particular anteriorly. Fore wing about 2.7 times as long as broad, infumate all over, with darker brown markings as given in the key (Text-fig. 2), its pubescence relatively rough, dark, not paler on pale parts of the wing blade. Relative measurements (on the holotype): costal cell 90 : 10, marginal vein 44, postmarginal vein 37, stigmal vein 23, maximum distance between upper edge of stigma and the postmarginal vein 6.6. Marginal vein 1.9–1.96 times as long as the stigmal.

Gaster 1.1–1.2 times as long as head plus thorax combined, about 2.6 times as long as broad itself, distinctly flattened dorsally, about 1.1 times as broad as thorax, broadest just behind middle, i.e., at basal half of fifth (postpetiolar) tergite. First tergite mainly smooth, following

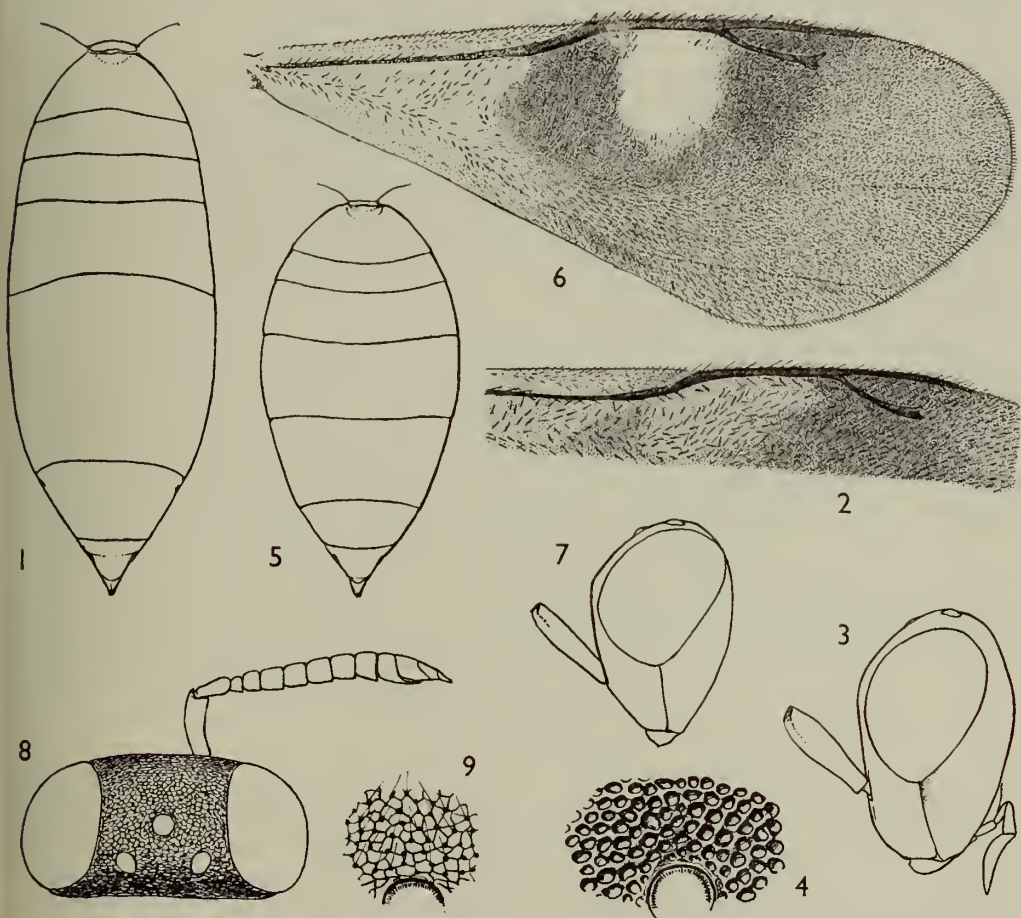
tergites with a smooth belt along hind margin. Otherwise gaster dorsally reticulate, very coarsely so on the fifth tergite. This tergite is the largest (Text-fig. 1), nearly as long as tergites 1 to 4 taken together (in median line), 0.89–0.95 times as long as broad itself. Hind margins of first, fourth and fifth tergites broadly shallowly emarginate. Hypopygium hardly reaching one-third of gaster. Hairs of gaster anteriorly whitish, posteriorly blackish.

♂. Unknown. It might be recognizable by the sculpture of head.

BIOLOGY not known.

Holotype ♀. GREECE: Attiki, Cape Sunion, SE of Athens, 7.iv.1917 (*Fodor*); in TM, Budapest.

Paratype. BULGARIA: 1 ♀, 7.vii.1964 (*Strejček*); in Bouček Collection.



FIGS 1–9. *Cleonymus*. 1–4. *C. balcanicus*, 1, gaster of ♀; 2, part of fore wing with pilosity and infuscation indicated; 3, head in lateral view; 4, sculpture on frons in front of median ocellus. 5–9. *C. brevis*, 5, gaster of ♀; 6, fore wing of ♀; 7, head in lateral view; 8, head of ♀ with antenna; 9, type of sculpture in front of median ocellus.

Cleonymus brevis sp. n.

(Text-figs 5-9)

♀. Body mainly dark (though in places bright) green to bronzy, more or less with bright violaceous reflections on vertex posteriorly, on sides of pronotum, on mesoscutum in front of axillae, on propodeum (at least laterally), on dorsal and lateral sides of hind coxae and anteriorly on first tergite. Vertical part of frons bright cupreous. Antennal flagellum dark brown to black, scape, and also femora, tibiae and tarsi of legs bright red, but tibiae mostly infusate, as well as tarsi apically. Fore wing (Text-fig. 6) with a broad brown infumation between base of parastigma and apical fifth of wing blade, interrupted partly by large hyaline macula anteriorly below marginal vein. Length 3-4.2 mm.

Head 1.1-1.14 times as broad as mesoscutum, in dorsal view 2.02-2.15 times as broad as long, with inner eye margins parallel; POL about 2.2-2.4 times the OOL. Head in facial view 1.37-1.38 times as broad as high. Frons between ocelli and the transverse blunt ridge (which is about 2.5 diameters from ocellus) fairly shiny, not very densely beset with piliferous punctures, interspaces generally broader than punctures but with an extremely fine broad-meshed engraved reticulation (alutaceous + puncturation = shagreening; Text-fig. 9). Subvertical part of frons angularly changing slope with the upper subhorizontal part (Text-fig. 7), densely transversely striate-reticulate; scrobes indistinct. Posterior part of vertex and occiput rugulose-reticulate. Relative measurements: head width 67, height 49, maximum distance between eyes 29, eye 34 : 29, malar space 19, mouth width about 28, scapus length 23, flagellum plus pedicellus combined 58. Pedicellus slightly longer than two following segments combined, these segments slightly transverse, subequal in length, the first narrower than the second; middle flagellar segments only very slightly transverse, seventh flagellar segment more transverse and slightly asymmetric, preclava with processus narrow but only slightly longer than body of the segment (Text-fig. 8).

Thorax dorsally (including propodeum) 1.7-1.8 times as long as broad, densely pubescent on pronotum and mesonotum, pubescence moderately long, mainly dark, but sometimes whitish on mid lobe of mesoscutum just in front of scutellum and in front of inner margins of lateral lobes. Sculpture mainly rugose-reticulate, more regularly reticulate on the disc. Mesoscutum 1.8 times to twice as broad as long. Propodeum in middle 0.43-0.45 the length of scutellum, with strong median carina which is about three times as long as the smooth convex dorsellum and only 0.35-0.38 the distance between inner edges of spiracles. Median part of propodeum, apart from the crenulate depressions, nearly smooth; groove formed by the flange posteriorly laterad of nucha in dorsal view not broader than the basal crenulate furrow. Metapleura rather densely hairy. Reticulate lower mesepimeron smaller than the nearly smooth upper part, the broad dividing depression in form of arched fovea reaching metapleural margin. Fore wing (Text-fig. 6) about 2.5 times as long as broad, hyaline in basal third and on the large spot below marginal vein; apex faintly infumate; otherwise with two brown cross-bands, one appended at parastigma, the other below postmarginal vein, the bands united on disc below white macula. Basal cell sparsely hairy below submarginal vein. Relative lengths in holotype; subcostal cell 72, marginal vein 34, postmarginal vein 34, stigmal vein 22, in two paratypes these measures 65 : 35 : 32 : 24 and 72 : 37 : 39 : 24, resp.

Gaster (Text-fig. 5) 1.8-1.97 times as long as broad and 1.23-1.27 times as broad as the mesoscutum, only 0.9-1.16 times as long as head plus thorax combined. Reticulation on basal halves of third and fourth tergite and on most of fifth tergite shallow, meshes mostly in form of transversely lengthened depressions; smooth belts at hind margins of tergites 5 and 6 with scattered raised piliferous punctures. Posterior margins of first, second and sixth tergites slightly produced, arcuate; fifth tergite 2-2.24 times as broad as long, in the middle always distinctly shorter than tergites 3 and 4 taken together. Hairs of gaster anteriorly whitish, posteriorly dark.

♂. Mainly black, with faint dark violaceous or dark green reflections on head and thorax, more brightly violaceous on propodeum, metapleurae and base of gaster. Antennae black; legs darker than in female, tibiae and tarsi blackish, also femora dorsally infusate and usually

with a violaceous sheen. Fore wing slightly infumate, mostly with suffused brown clouds below parastigma and around stigmal vein. Head and thorax much as in female but sculpture relatively coarser, though in some places more superficial. The alutaceous meshes on frons deeper, frons therefore duller. Scrobes shallow but conspicuous. Antennae stouter than in female and *C. laticornis*; scapus three times as broad as long; pedicellus plus flagellum about twice as long as width of frons (49 : 25); pedicellus about 1.5 times as long as broad dorsally; first flagellar segment more anellus-like than in female, shorter and narrower than the second, which also has more adpressed pubescence like the rest of flagellum but unlike pedicellus and anellus; base of flagellum distinctly expanding below (in side view), the third segment the broadest, slightly asymmetric, slightly broader than the otherwise stoutly filiform flagellum; all funicle segments transverse, mostly about 1.5 times as broad as long, with the usual thick semi-erect pubescence. *Fore wing*: relative lengths of marginal, postmarginal and stigmal vein as 25 : 25 : 17 (allotype; in the other paratypes as 25 : 28 : 18 and 25 : 28 : 19, resp.). Gaster more densely hairy than in female, hardly narrower and slightly shorter than thorax, with petiole distinct, though fairly transverse, smooth and convex dorsally; fifth tergite about as long as two preceding tergites together. Length of body 3–3.2 mm.

VARIATION. Compared with the body the size of the eyes in females seems to vary considerably. Whilst in the holotype, breadth of the eye equals the distance between eyes, in one paratype of 3.7 mm body length, vertex breadth is 1.2 times the eye breadth, and in another paratype of only 3 mm length (a dwarf, reared in laboratory; wings still in pupal skin) the relation is 1.44 : 1. In the three males this relation varies between 1.14 and 1.18 to 1.

BIOLOGY. Parasite of xylophagous beetles; reared from *Hylesinus toranio* Bern. (Col., Scolytidae).

Holotype ♀. ITALY: Toscana, Sesto Fiorentino, vii.1943 (*L. Ceresa*), '*Cleonymus depressus* (F.) det. L. Masi'; now in BMNH.

Paratypes. CZECHOSLOVAKIA: Slovakia, Zádíel, ex *Hylesinus toranio*, 1 ♀, 1954 (*A. Pfeffer*); in Bouček Collection. FRANCE: Vienne, Isère, 3 ♂ (one of them allotype) (*L. Falcoz*); in MHN, Geneva, along with 1 ♀ without data from Coll. Chevrier. YUGOSLAVIA: Croatia, Krapina, 1 ♀ (*Hensch*); in ZIPF, Zagreb.

Before Graham's monograph this species was frequently mistaken for *Cleonymus obscurus* Walker and the Czechoslovak specimen was also recorded under that name by Bouček (1958 : 369).

Cleonymus laticornis Walker

Ichneumon depressus Fabricius, 1798 : 231. Type ♀, FRANCE: Paris (MNHN, Paris; or lost). [Nec Gmelin, 1790.]

Cleonymus laticornis Walker, 1837 : 351. Holotype ♂, IRELAND: Bexley (NM, Dublin).

?*Cleonymus obscurus* Walker, 1837 : 352. Lectotype ♂, BRITAIN: London (BMNH) [examined].

I have examined almost all the material of these two forms which Dr Graham had at his disposal and, thanks to several colleagues, extensive additional material of these rather rare insects. Special attention was paid to the variation and it was found that the relative length of malar space and the eye does not yield any reliable difference between *C. laticornis* and *C. obscurus* (used by Graham, 1969). In 33

females with body length ranging between 3.1–5.7 mm, the ratio between malar space and eye length varied mainly between 0.5 and 0.57 (in 27 ♀♀), not suggesting any gap or two-peak curve, but with two extreme deviations of 0.44 and 0.46, and another two of 0.65 and 0.66. The small figures do not correlate completely with the darker body colour, as assumed by Graham. In general, the figures obtained seem to suggest a trend in the eyes being relatively smaller in bigger specimens, which contrasts with what I found in *Cleonymus brevis* sp. n. The colour difference is notoriously unreliable with Pteromalid parasites of xylophagous beetles, but because the material of males, particularly of the darker form with hardly any wing markings (*obscurus*), is very scarce, I am leaving the question unresolved, although the study of the females suggests that only one species is involved.

For other references and information see Graham (1969 : 38, 39).

MATERIAL EXAMINED includes specimens from Britain, France, Switzerland, Czechoslovakia, Yugoslavia, Italy and Morocco (Tangier).

EUNOTINAE

EUNOTUS Walker

Eunotus Walker, 1834 : 297. Type-species: *Eunotus cretaceus* Walker, by monotypy.

Tridymus subgen. *Tritypus* Ratzeburg, 1852 : 227. Type-species: *Tridymus (Tritypus) areolatus* Ratzeburg, by monotypy.

Megapelte Förster, 1856 : 63, 66 [replacement name for *Eunotus* Walker, supposedly pre-occupied].

Eunotus subgen. *Eunotellus* Masi, 1931 : 423. Type-species: *Eunotus (Eunotellus) aquisgranensis* Masi; designated by Graham, 1969.

For other references see Graham (1969).

The genus was divided by Masi (1931) in two subgenera, *Eunotus* s. str., with 5-segmented funicle in females, and *Eunotellus* Masi, with 4-segmented funicle in females. The males, however, do not yield any character in support and are difficult to separate even on specific level. Now another group has emerged, with *E. hofferi* sp. n. and *E. kocourecki* sp. n., distinguished by the relatively more flattened body with coarser and shallower sculpture, 3-toothed mandibles (Text-fig. 15) and different form of antennae in the males. Therefore, at least for the time being, it seems to me more appropriate to adopt species-groups rather than subgenera.

KEY TO EUROPEAN SPECIES

Females

- | | | |
|---|---|-------------------------------|
| 1 | Funicle 4-segmented. | |
| | Flagellum clavate; thoracic reticulation dense; scutellum transverse,
1.13–1.3 times as broad as long; fore wing pubescence very dense; marginal
vein 1.34–1.63 times as long as the stigmal; first tergite smooth. | |
| | | <i>parvulus</i> Masi (p. 287) |
| – | Funicle 5-segmented | 2 |
| 2 | (1) First tergite distinctly reticulate, except near edges | 3 |
| – | First tergite smooth | 5 |

- 3 (2) Brachypterous (Text-fig. 25); thorax very flat dorsally, with wide-meshed reticulation, meshes with smooth bottom; scutellum nearly 1.4 times as broad as long; propodeum very short, only one-sixth the length of scutellum; antenna slender (Text-fig. 10), first funicle segment transverse, the second subquadrate, clava about 2.5 times as long as broad . . . *hofferi* sp. n. (p. 277)
- Macropterous; the other characters not all present in combination . . . 4
- 4 (3) Scutellum distinctly though weakly convex, nearly as long as broad, very densely reticulate, dull; apex of scutellum bluntly angulate and reaching slightly beyond line with hind corners of propodeum; the latter medially extremely short. Sensilla linearia on flagellum very distinct; clava about three times as long as broad and usually darker than the mostly testaceous funicle. Marginal vein of fore wing 1.5-1.85 times as long as the stigmal, the latter bent, slightly longer than postmarginal vein and angle between them rather sharp, about 30°; apex of stigmal vein about half the length of this vein from front margin of wing. Eye round. Body bluish black . . . *cretaceus* Walker (p. 281)
- Scutellum (Text-fig. 13) flat, almost 1.5 times as broad as long, rather coarsely reticulate, fairly shiny, its apex broadly rounded and not reaching the level of hind corners of propodeum; propodeum in the middle at least one-third as long as scutellum. Sensilla of flagellum indistinct, clava hardly more than twice as long as broad, its first segment transverse. Marginal vein fully 2.5 times as long as the stigmal, angle between short postmarginal vein and stigmal vein about 45°; apex of stigmal vein about two-thirds its length from front margin of wing. Eye longer than broad as 18 : 16. Body greenish black. . . *kocourekii* sp. n. (p. 279)
- 5 (2) Only first flagellar segment anellus-like, the second much bigger and subequal to third segment. Scutellum at least slightly (1.07-1.15 : 1) longer than broad (steep axillulae, if seen dorsally, not included), in the apical third its sides converging at about a right angle . . . 6
- Basal two segments of flagellum anellus-like (Text-fig. 24), i.e., the second distinctly smaller than the third. Scutellum shorter than broad, usually broadly rounded apically . . . 7
- 6 (5) Flagellum stout but hardly clavate (Text-fig. 18), its first segment narrower and hardly half as long as the second, which is almost as broad as the fifth; clava fully twice as long as broad, not distinctly asymmetric. Marginal vein less than twice (1.45-1.85 times) the length of stigmal vein (Text-fig. 17). POL to OOL as about 2.8 : 1; occipital ridge often blunt, at least laterad of posterior ocelli. Body often about 2 mm . . . *areolatus* (Ratzeburg) (p. 282)
- Flagellum strongly clavate, gradually broadening towards clava, the latter hardly 1.5 times as long as broad, asymmetric, subtruncate at apex. Marginal vein clearly more than twice as long as the stigmal (Text-fig. 20). POL to OOL about 4 : 1; occipital ridge very sharp, even laterally. Body at most 1.8 mm . . . *obscurus* Masi (p. 284)
- 7 (5) Thoracic dorsum dull, densely ruguloso-reticulate. Antennal clava long-ovate, moderately stout, not distinctly asymmetric (Text-fig. 22). . . *acutus* Kurdjumov (p. 285)
- Thoracic dorsum moderately shiny, as the sculpture is more superficial. Antenna more strongly clavate (Text-fig. 24), often asymmetric, subtruncate ventro-apically . . . 8
- 8 (7) Angle between stigmal and postmarginal vein very sharp, usually about 30°; space between the two veins at least twice as long as broad, postmarginal vein at least 2/3 the marginal vein. Antennal clava fuscous, distal funicle segments yellowish. OOL 1.3-1.5 the diameter of lateral ocellus. 1.2-1.4 mm . . . *nigriclavis* (Förster) (p. 286)

Angle between stigmal and postmarginal vein broad, about 60° ; space between the two veins about as long as broad, postmarginal vein half the marginal. Antennal clava and funicle unicolorous, yellow. OOL subequal to maximum diameter of lateral ocellus. 1.1 mm *merceti* Masi (p. 286)

Males

- 1 Antennae relatively long, flagellum plus pedicellus combined at least 1.2 times the width of head; first funicle segment at least slightly shorter than the fourth, the latter always distinctly elongate, in length subequal to the first claval segment (Text-figs 11, 14); third claval segment shorter than the first; flagellum with strong and high sensillar ridges, these uninterrupted on the whole length of the segment, 4-5 of them visible in any lateral view. Body rather flattened; reticulation on thorax wide-meshed; median carina of propodeum not distinctly raised anteriorly. Mandibles 3-toothed (Text-fig. 15) 2
- . Antennae relatively shorter, flagellum plus pedicellus combined at most 1.1 times the head width; first funicle segment usually longer than the fourth which, if elongate, is distinctly longer than the first claval segment (Text-fig. 16); the latter much shorter than the third claval segment which bears two rows of sensilla; flagellar longitudinal sensilla much finer and shorter, but more numerous, forming at least on some of the basal segments two or three irregular rows, i.e., they are not united to form strong regular ridges along the whole segment as above. Body not unusually flattened; reticulation on thorax usually dense; median carina of propodeum raised anteriorly to form a distinct tooth. Mandibles 2-toothed. 3
- 2 (1) Body length 0.6-0.7 mm; basal tergite of gaster smooth; venation of fore wing pale brown *hofferi* sp. n. (p. 277)
- . Body 1.0-1.3 mm; first tergite on disc extensively coarsely engraved-reticulate (as Text-fig. 13); venation of fore wing dark brown *kocourecki* sp. n. (p. 279)
- 3 (1) First tergite mainly longitudinally reticulate, smooth only near the edges; tibiae extensively testaceous; body 0.85-1.2 mm *cretaceus* Walker (p. 281)
- First tergite smooth all over; tibiae and length otherwise 4
- 4 (3) Scutellum distinctly longer than broad (measured between axillular furrows), its margins posteriorly converging at about 90° or a slightly sharper angle. Inner angle of axilla 60° or more. Postmarginal vein usually longer than the stigmal. Body usually at least 1.2 mm in length 5
- Scutellum shorter, at most as long as broad but usually slightly transverse, posteriorly rounded or, if sides converging, the angle is more than 90° . Inner angle of axilla distinctly less than 60° . Postmarginal vein often shorter than or as long as the stigmal. Body often less than 1.2 mm 6
- 5 (4) Marginal vein about 2.5 times as long as the stigmal. Body small. (According to Masi, 1931) *obscurus* Masi (p. 284)
- Marginal vein about 1.7-1.8 times as long as the stigmal. Body often relatively larger, up to 2 mm, but small specimens of 1 mm are also known. *areolatus* (Ratzeburg) (p. 282)
- 6 (4) Angle between postmarginal and stigmal vein very small, about 30° ; stigmal vein often only hardly shorter than the marginal. Body 0.75-0.95 mm. Flagellum brownish, combined with pedicellus often shorter than width of head; distal funicle segments subquadrate, constrictions between segments very conspicuous; pedicellus not much narrower than and distinctly more than half as long as the first funicle segment *nigriclavus* (Förster) (p. 286)

- Angle between postmarginal and stigmal vein broader, usually about 45° or more; stigmal vein distinctly shorter than the marginal. Body longer than 0.85 mm. Flagellum mostly blackish, its length with pedicellus usually distinctly more than width of head; funicle more compact, constrictions between segments usually hardly conspicuous, distal funicle segments elongate, the first distinctly broader and usually about twice as long as pedicellus 7
- 7 (6) Eye relatively larger (Text-fig. 26), 1.02–1.16 times as high as broad, maximum height 1.2–1.4 times the malar space. Mid and hind tarsi, sometimes also tibiae, extensively testaceous. Wing pubescence very dense. *parvulus* Masi (p. 287)
- Eye relatively smaller (Text-fig. 23), about as high as broad or slightly broader, its maximum height about 1.1 times the malar space. Mid and hind tarsi testaceous only basally, tibiae mostly fuscous. Wing pubescence generally less dense than above *acutus* Kurdjumov (p. 285)

Note: The male of *E. merceti* Masi is not known.

THE KOCOUREKI-GROUP

Eunotus hofferi sp. n.

(Text-figs 10–12, 25)

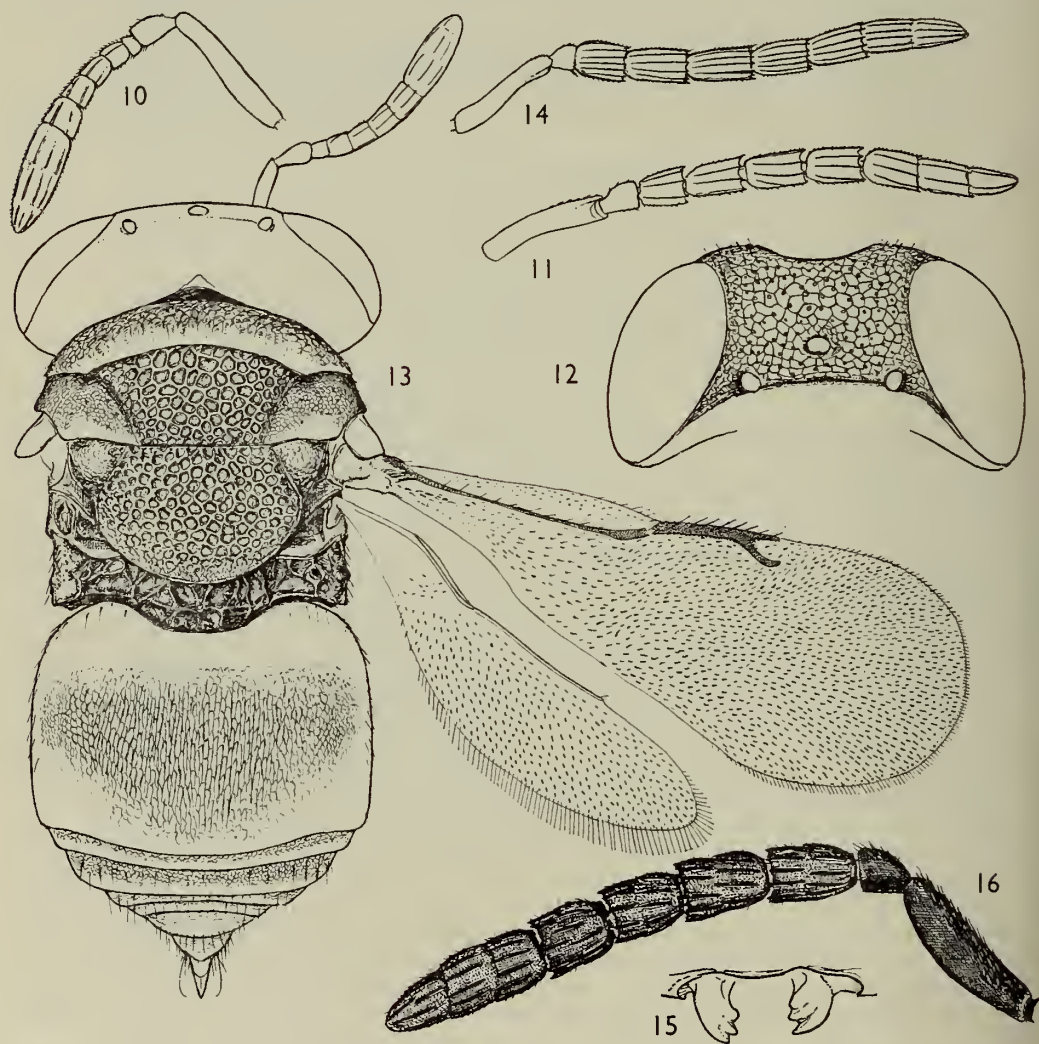
♀. Body black, in places with a faint dark green or bluish green tint. Antennae mainly testaceous but scapus infusate except for narrowly pale apex; pedicellus also infusate. Legs concolorous with body, tarsi testaceous except apical segment. Wing rudiments infumate. Length 1.1 mm.

Head (Text-figs 12, 25) nearly 1.2 times as broad as mesoscutum, rather stout, only 1.9 times as broad as long (in dorsal view along bottom of scrobes). POL about 6 times the OOL, which is hardly more than one ocellus diameter; median ocellus distinctly in front of line through front edges of lateral ocelli, the ocellar triangle 2.6 times as broad as high. Upper frons 0.43 breadth of head, rather shiny, engraved-reticulate, almost every mesh of reticulation with a small excentric piliferous puncture (Text-fig. 12). Lower frons with reticulation denser and less regular, distinctly raised on fairly concave scrobes. Eye very large, slightly higher than broad (16 : 14.5), without conspicuous pubescence. Other relative measurements: width of head 31.5, height 23, width of frons 13.7, malar space hardly 10, width of mouth about 9 (broadening posteriorly), length of scapus 11.3, flagellum plus pedicellus 21.5, i.e., about two-thirds width of head. Scapus weakly sinuate, feebly thickened in basal half; pedicellus dorsally about 1.5 times as long as broad, first flagellar segment anelliform (Text-fig. 10), narrower than the second, about 0.6 times as long as broad; second flagellar segment hardly narrower than the third but slightly transverse, the following three segments slightly increasing in width and all subquadrate; clava bluntly lanceolate, distinctly broader than preceding segment, about as long as the four preceding segments combined. Flagellum moderately clavate (in terms within the genus), with sparse longitudinal sensilla which are as long as the segments but absent from ventral side of clava (as usual in the genus; this has caused some authors to regard clava sometimes as indistinctly segmented when examined from ventral side).

Thorax flattened above, slightly shorter than long dorsally. Pronotum medially about three-fifths the length of mesoscutum, its posterior half nearly smooth. Mid lobe of mesoscutum nearly 2.5 times as broad as long, notauli strongly diverging forward; mid lobe as well as scutellum with broad-meshed shallow, but raised, reticulation. Scutellum lateroposteriorly

more finely reticulate-punctulate, itself 1.5 times as broad as long; axillar furrows strongly converging but reaching mesoscutum well outside of notauli. Metanotum indistinct. Propodeum extremely short, about one-sixth the length of scutellum, costula not distinct, median carina very short but raised. Pleural parts of thorax reticulate. Legs relatively strong, femora moderately thickened. *Wings* rudimentary; fore wing triangular, obliquely truncate, reaching just over base of gaster (Text-fig. 25).

Gaster slightly shorter than head plus thorax combined, strongly convex. First tergite about 1.3 times as broad as long, distinctly longitudinally engraved-reticulate, sculpture fine and becoming obliterated towards the smooth hind margin; the latter hardly produced; epipleurae of first tergite with the same sculpture as its dorsum.



FIGS 10-16. *Eunotus*. 10-12. *E. hofferi*. 10, ♀ antenna; 11, ♂ antenna; 12, head with sculpture on frontovertex. 13-15, *E. kocourek*. 13, ♂, infumation of fore wing and sculpture of head not indicated; 14, ♂ antenna; 15, mandibles. 16, *E. acutus*, ♂ antenna.

♂. Body colour as in female. Antennae and legs brownish black, tarsi paler brown towards base. Wings fully developed, subhyaline. Length about 0.7 mm. Head fully 1.2 times as broad as mesoscutum. Relative measurements: width of head 25.5, length 12, height 19, frons width 14, eye 10 : 10, malar space 9, scapus 10, flagellum plus pedicellus 32. Pedicellus dorsally slightly elongate, about three-fifths of first funicle segment. All flagellar segments elongate (Text-fig. 11), the first slightly shorter than the second or fourth, the latter subequal to first claval segment; third claval segment the smallest, narrow, subacuminate. Flagellum with coarse ridge-like sensilla which extend beyond apex of the segments as distinct teeth, in lateral view about 5 ridges visible on each segment. Thorax as usual in alate forms of genus, 1.25 times as long as mesoscutum broad, dorsally more convex than in female, fairly shiny due to wide-meshed raised, but shallow, reticulation. Pronotum rather convex, its hind margin broadly emarginate, therefore in middle only half as long as mesoscutum; mid lobe of the latter about 1.7 times as broad as long. Scutellum 0.95 times as long as broad. Propodeum moderately sloping, in middle about 0.4 the length of scutellum and here distinctly produced beyond sublateral parts; costula irregular, less distinct than the weak median carina and the indicated plicae. Fore wing rather regularly and fairly densely pubescent. Relative measurements: wing length 50, width 22.5, costal cell length 17, marginal vein 8, postmarginal 3.5, stigmal vein 3.2 (in another specimen last three figures 7 : 3 : 3). First tergite 1.3 times as broad as long, dorsally smooth, but epipleurae (ventral sides of tergites) with some wide-meshed alutaceous reticulation as in female, but weaker.

Apart from the antennal characters and the 3-toothed mandibles, which suggest close relationship with *E. kocourek* sp. n., *E. hofferi* differs from *E. parvulus* Masi and *E. acutus* Kurdjumov by its much shinier thorax.

BIOLOGY. Host not known; all specimens collected on xerothermic grassland slopes, on limestone, sand or loess.

Holotype ♀. CZECHOSLOVAKIA: S. Moravia, Dolní Věstonice, 4.vii.1952 (*Hoffer*); in BMNH.

Paratypes. CZECHOSLOVAKIA: Bohemia, Praha-Chuchle, 1 ♂, allotype, 11.vii.1955 (*Bouček*); S. Moravia, Dolní Věstonice, 1 ♂, 24.v.1954 (*Hoffer*); SE. Slovakia, Piliš Hill nr Slov. Nové Mesto, 2 ♂, 3. and 13.vii.1950 (*Hoffer*); Královský Chlmec, 1 ♂, 20.v.1958 (*Bouček*); paratypes partly in NM, Prague, partly in Bouček Collection.

The species is named in honour of Dr A. Hoffer, of Prague, a prominent Czech hymenopterist.

Eunotus kocourek sp. n.

(Text-figs 13-15)

♀. Black, with faint dark green tint mainly on head and thorax. Antennae dark testaceous, with pedicel infuscate and scapes also slightly infuscate in basal halves. Legs concolorous with body, fore basitarsus basally and mid and hind tarsi except the claw segment dark testaceous. Fore wing infumate but paler basally at hind margin and in apical third; venation dark brown. Length 1.4 mm.

Head broader than mesoscutum as 41 : 35, in dorsal view 2.2 times as broad as long, strongly crescentic, with occiput strongly excavated, but dorsal ridge not sharp. POL to OOL about as 4 : 1, OOL itself equals about 1.4 diameter of ocellus; line drawn through front edges of lateral ocelli intersecting hind quarter of median ocellus, ocellar triangle about 3.8 times as broad as

high. Upper frons in front of ocelli nearly half (0.47) as broad as head, rather dull, with conspicuous engraved reticulation, each mesh bearing a piliferous puncture which takes up at least half of mesh surface. Lower frons with very dense raised reticulation, this denser in the middle, the very shallow scrobes therefore still duller; sublaterally reticulation less dense and less regular, at orbits and on genae again very dense. Relative measurements: head width 41, height 27, frons width 19.5, eye 15 : 17.5, malar space 13, mouth width about 11. Eye pubescence sparse, short, inconspicuous. Both mandibles 3-toothed. Relative length of scape 15, flagellum plus pedicellus 27, i.e., slightly less than width of head less one eye. Scapus slender, distinctly sinuate, scarcely thicker in basal half; pedicellus dorsally nearly twice as long as broad (Text-fig. 13); flagellum slender, weakly clavate, its first segment shorter but not abruptly narrower than the second and still slightly longer than broad; longitudinal sensilla of flagellum sparse, long, 1-2 in a view on second and third segment and 3 on fourth and fifth segment; clava hardly longer than three preceding segments combined, long-oval, nearly three times as long as broad, with three rows of sparse sensilla, its first segment slightly longer than the preclaval one and distinctly longer than the third claval segment.

Thorax dorsally flattened, broad (Text-fig. 13), from anterior edge of collar down to apex of propodeum only as long as breadth of mesoscutum. Pronotum dorsally 0.45 the length of mesoscutum, laterally narrowed, without shoulders; front half of collar finely rugulose-reticulate, hind half nearly smooth, shiny; lateral panel of pronotum above with deep depression delimited by a horizontal crest opposite to lower edge of the small prepectus. Mid lobe of mesoscutum twice as broad as long, together with scutellum coarsely and rather deeply reticulate-punctured; side lobes and axillae finely sculptured, partly smooth at cross-suture. Scutellum 1.45 times as broad as long, apically broadly rounded, apical quarter much more finely and superficially sculptured than the disc; axillar furrow reaching mesoscutum just outside notaulices; axillulae not distinct. Metanotum visible only laterally. Propodeum subhorizontal, medially slightly more than one-third the length of scutellum; median carina low, rather broad, weakly raised before middle; costula rather indistinct, crossing the mainly longitudinal rugae; spiracle oval, open; hairs of callus short, not conspicuous. Thoracic pleurae dull, rather deeply reticulate, except below the wings where sculpture forms longitudinal striae; mesepimeron without central pit; metapleura and lower part of lateral panel of propodeum slightly shiny. *Fore wing* fully developed, about 2.6 times as long as broad; its hind margin with distinct lobe beyond basal quarter; front margin shallowly emarginate at end of costal cell. Relative measurements: length of costal cell 27, marginal vein 10, postmarginal vein 3.5, stigmal vein 4. Wing disc with dense but extremely short hairs, in basal two-fifths hairs much longer and rather sparse.

Gaster with slightly protruding ovipositor sheaths as long as head plus thorax combined (Text-fig. 13). First tergite 1.3 times as broad as long, its hind margin produced slightly arcuately, dorsal and epipleural surface distinctly longitudinally striate-reticulate, but smooth basally and near edges, more broadly so in hind corners.

♂. Differs from female as follows. Antennae mostly black, scapus sometimes dark testaceous at both ends or only distally. Apex of mid and hind tibiae shortly testaceous. Fore wing subhyaline, mostly only with slight infumation forming an angulate streak below parastigma along basal and cubital folds. Length 1.0-1.2 mm. Head more regularly reticulate-punctured, frons above duller, reticulation raised. In dorsal view temples visible though strongly receding. Eyes relatively smaller; their relative measures 12 : 13, width of frons 19.5, malar space 12, mouth width 10, scapus 13 (nearly as slender and sinuate as in female), flagellum plus pedicellus combined 44, i.e., four-thirds the head width. Pedicellus subglobular, about half as long as first funicle segment. All flagellar segments (Text-fig. 14) with high coarse sensillar ridges along the whole lengths which project like teeth beyond apex of each segment; groove-like bottoms slightly shiny, with short regular semi-erect hairs. Flagellum slightly tapering towards apex, fourth segment about 1.7 times as long as broad, slightly longer than the first but hardly longer than the following first claval segment; third claval segment the smallest, distinctly shorter than any other flagellar segment. Scutellum regularly reticulate-punctured all over. Gaster hardly half as long as head plus thorax together, first tergite distinctly longitudinally engraved-reticulate.

BIOLOGY unknown. Collected on xerothermic grassland.

Holotype ♀. BULGARIA: Sandanski, vi.1969 (*Kocourek*); in BMNH.

Paratypes. BULGARIA: Sandanski, 4 ♂ (including allotype) (*Kocourek*); Bouček Collection.

Named in honour of Ing. M. Kocourek, a Czech hymenopterist and very good collector.

Eunotus hofferi and *E. kocourecki* form a very distinctive species-group. Unlike the other species of the genus they have 3-toothed mandibles (Text-fig. 15), in males the longitudinal sensilla of the flagellum are very strong, ridge-like and extend along the whole segment and the segments of the funicle and clava are subequal, as stressed in the key. The females, apart from the rather depressed thorax with the scutellum very short and transverse, have a peculiar depression on the upper part of the lateral panel of the pronotum; this fovea is present though less conspicuous, in the males. Both species seem to be associated with xerothermic habitats although nothing is yet known about their hosts.

THE *CRETACEUS*-GROUP

Eunotus cretaceus Walker, although rather distinctive, seems to be more related to *E. areolatus* and *E. obscurus* Masi than to the above group or the *acutus*-group.

Eunotus cretaceus Walker

Eunotus cretaceus Walker, 1834 : 298. Lectotype ♀, BRITAIN: Isle of Wight (BMNH) [examined].

Eunotus festucae Masi, 1928 : 128. Syntypes ♂♂, ♀♀, ITALY: San Vito near Modena, ex *Eriopeltis festucae* (Fonscolombe) (MCSN, Genoa and BMNH) [examined].

For comments on the type-material and synonymy see Masi (1931) and Graham (1969). I have seen Masi's material in Genoa but at that time (1965) I did not select the lectotype.

BIOLOGY. *E. cretaceus* develops as predator on the eggs (probably all species of the genus develop in a similar way) of the following Coccids on grasses: *Eriopeltis festucae* (Fonscolombe) (e.g., Masi, 1928 and 1931), *E. agropyri* Borchsenius (n. rec.), *E. ?strelkovi* Borchsenius (Graham, 1969), *Eriopeltis* sp. (n. rec.), *Scythia* (= *Mohelnia*) *festucae* (Šulc) (n. rec.).

DISTRIBUTION. Europe, from Britain and southern Sweden to southern Italy and to the U.S.S.R. (Moldavian S.S.R. and Georgia).

MATERIAL EXAMINED.

Type-data given in synonymy.

BRITAIN: Surrey, White Downs near Dorking, 1 ♂, 5.vii.1964, 1 ♂, 20.vi.1970 (Bouček); Warwickshire, Stratford-on-Avon, ex *Eriopeltis festucae*, 4 ♀, 4 ♂, 16.viii.1965 (R. E. Evans), BMNH. SWEDEN: Skåne, Kivik, ex *E. festucae*, 4 ♀, 1 ♂, viii.1938, and Löderup, 1 ♂, 22.vii.1938 (D. M. S. & J. F. Perkins), BMNH. GERMANY: 'Deutschland', 1 ♀ (Erichson), MNHU, Berlin, identified as *E. festucae* by Masi. CZECHOSLOVAKIA: Bohemia, Milá, Středohoří Mts, 1 ♂, 5.vii.1956 (Bouček); Praha-Hanspaulka, ex *Eriopeltis festucae*, 14 ♀, 3 ♂, about 1945 (B. Starý); Praha-Košíře, 1 ♂, 1.vi.1947 (Bouček); Malá Skála near Turnov, 1 ♀, 1942 (Obenberger), NM, Prague; Nové Město nad Metují, 1 ♀, vii.1961 (J. Macek); Moravia, Mohelno, 2 ♀, 6.vii.1957 (Bouček); Slovakia, Kováčov near Štúrovo, ex *Scythia festuceti*, 6 ♀, 1 ♂, 1960 (Hoffer); Mt Revaň, 1200 m, 1 ♀, 5.ix.1956 (J. Brtek). U.S.S.R., MOLDAVIAN S.S.R.: Slobodzeia, ex *Eriopeltis agropyri*, 4 ♀, viii.1960 (Talitzki). GEORGIA: Tbilisi district, ex *Eriopeltis* sp., 1 ♀, 3 ♂, vi.1957 (Hoffer).

Eunotus areolatus (Ratzeburg)

(Text-figs 17-19)

Tridymus (*Tritypus*) *areolatus* Ratzeburg, 1852 : 227, 2 figs. Type ♀, W. GERMANY: Hohenheim [lost].

[*Enargopelte obscurus* (!) Förster; Kryger, 1943 : 79-81, figs 5, 6. Misidentification.]

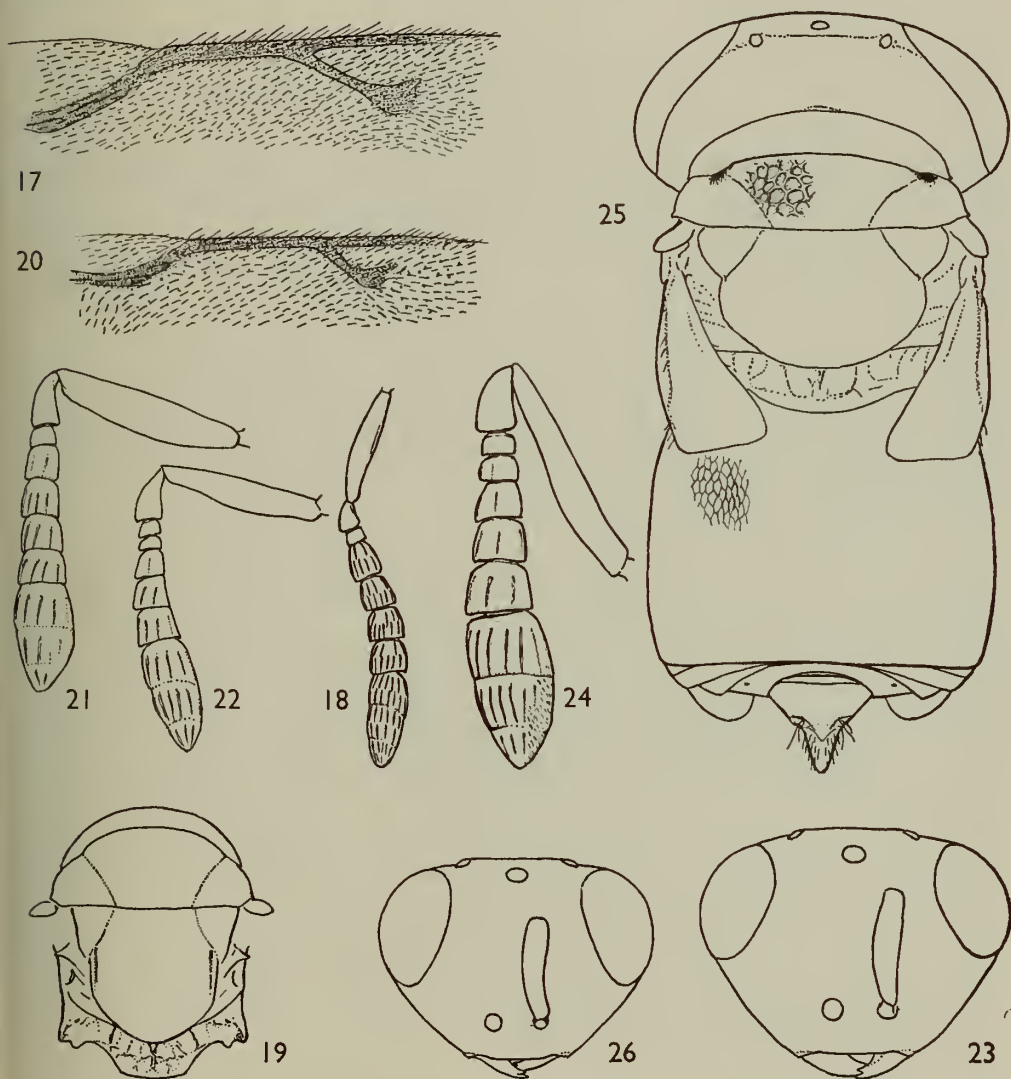
Eunotus subcyaneus Erdős, 1953 : 222-223, fig. 1. Holotype ♀, HUNGARY: Kelebia [TM, Budapest] [examined]. **Syn. n.**

?*Eunotus antshar* Nikolskaya in Nikolskaya & Kyao, 1954 : 413-414, figs 5a-d. LECTO-TYPE ♀, U.S.S.R.: W. Kazakhstan, Yanvartsevo (ZI, Leningrad), here designated [examined].

This is the only species known to me which has the scutellum elongate and, in the female, the antenna with one anellus only and the flagellum rather stout, not much attenuate towards the base. Both these characters are seen in Ratzeburg's figure. This author also described the propodeum as having a median areola (on the basis of which he erected the subgenus *Tritypus*). As a matter of fact the areola is not developed in any *Eunotus*. But in the present species the median part of the propodeum protrudes posteriorly more than in any other species and being separated from the sublateral parts by a distinct costula, it may, in some lights and at lower magnification, and when seen slightly from behind, suggest a presence of a median area (Text-fig. 19). In such a view the median carina often becomes obsolete, while the costula is distinct, in middle angulate forward. *E. areolatus* is also the largest known species in Europe and this again fits Ratzeburg's statement of 2". He received his specimens from a '*Coccus*' on *Salix aurita* in south-western Germany. This suggests a host not associated with warm places and indeed, most material at hand comes from moister and colder habitats.

I have seen also Kryger's material from Denmark kindly made available by Mr Bakkendorf and the type of *E. subcyaneus* Erdős on which the first vital information was supplied by Prof. Szelényi, who later kindly submitted the type itself. I have little doubt that *E. antshar* also is the same. Its lectotype female, kindly

submitted by Dr Trjapitzin, differs from the two females of *areolatus* presently at my disposal in having the antennal scape slightly stouter ($3.4 : 1$), the malar space slightly shorter than eye ($25 : 28$; in *areolatus* from Sweden $30 : 29$ and $25 : 25$, resp.), and the propodeal basal tooth in lateral view slender and jutting out towards the scutellum. These differences are small but may prove eventually to be constant, when more is known.



FIGS 17-26. *Eunotus*. 17-19. *E. areolatus*. 17, fore wing venation in ♀; 18, ♀ antenna; 19, thorax. 20-21. *E. obscurus*. 20, fore wing venation in ♀; 21, ♀ antenna. 22-23. *E. acutus*. 22, ♀ antenna; 23, ♂ head in facial view. 24, *E. nigriclavus*, ♀ antenna. 25, *E. hofferi*, body of ♀. 26, *E. parvulus*, head of ♂ in facial view.

BIOLOGY. Ratzeburg (1852) obtained his *E. areolatus* from a 'Coccus' on *Salix aurita*, Kryger (1943) collected it on *Salix repens*, Erdős (1953) on *Pinus nigra*. *Eunotus antshar* was reared from *Rhodococcus spiraeae* (Borchsenius) (Nikolskaya & Kyao, 1954). The species, in common with the following *E. obscurus*, seems to be associated with Coccids on trees and bushes, not on grasses.

DISTRIBUTION. Sweden, Denmark, W. Germany, Czechoslovakia, Hungary; ?U.S.S.R. (W. Kazakhstan).

MATERIAL EXAMINED.

Type-data of *E. subcyaneus* and of *E. antshar* given in synonymy.

SWEDEN: Upland, Vallentuna, 1 ♂, 1 ♀, 17.iv.1960 (*K. J. Hedqvist*); Skåne, Höör district, 1 ♀, 11.vi.1938 (*D. M. S. & J. F. Perkins*), BMNH. **DENMARK:** N. Sealand, Lyngby nr Copenhagen, 1 ♂, 9.vi.1962 (*Bakkendorf*); Sandkroen, 1 ♂, 26.v.1931 (*Kryger*), UZM, Copenhagen. **CZECHOSLOVAKIA:** Bohemia; Jedlová near Rumburk, 1 ♂, 29.vi.1957 (*Bouček*); Moravia, Hodice near Jihlava, 3 ♂, 7.vi.1953 (*F. Kodys*).

***Eunotus obscurus* Masi**

[*Eunotus cretaceus* Walker; Masi, 1907 : 262–266, figs 23, 24. Misidentification.]

Eunotus obscurus Masi, 1931 : 424, 428–430, fig. 1a. Syntypes ♀♀ and 1 ♂, FRANCE (MHN, Paris), GERMANY (NM, Vienna), ITALY: Bevagna (MCSN, Genoa) and SPAIN (IEE, Madrid) [mostly examined].

[*Eunotus cretaceus* Walker; Kryger, 1943 : 75–78, figs 3, 4. Misidentification.]

I have seen most of the syntypes of *E. obscurus* and compared them with my specimens, but at that time (1965, 1966) did not select the lectotype. Kryger's material was also examined. The latter author (1943) mentions having reared 35 females but no male. Neither have I seen any male in spite of having had more varied material. The only male known is the one recorded by Masi (1931) from Spain. *Eunotus obscurus* may be parthenogenetic, at least in northern and central Europe. Even the description of the Spanish male, judging from the unusually long marginal vein, may concern the closely related *Eunotus areolatus* (Ratzeburg).

BIOLOGY. The parasite attacks Coccids on various bushes and trees, mainly *Pulvinaria vitis* (L.) (= *betulae* L.) (Masi, 1931 and n. rec.; probably also 'Coccus on *Salix repens*' concerns this species; Kryger, 1943). Another record is *Parthenolecanium persicae* (F.) on *Robinia pseudacacia* L. (Masi, 1931).

DISTRIBUTION. Denmark, W. Germany, France, Spain, Italy, Czechoslovakia, U.S.S.R. (Moldavian S.S.R. and ?Uzbekistan).

MATERIAL EXAMINED.

Type-data given in synonymy.

DENMARK: N. Sealand, Sandkroen, ex *Coccus* on *Salix repens*, 4 ♀, coll. vi.1929, em. v.1930 (*Kryger*). **CZECHOSLOVAKIA:** E. Slovakia, Košice, 1 ♀, 31.v.1952 (*Kocourek*). **U.S.S.R., MOLDAVIAN S.S.R.:** Dubossary, ex *Pulvinaria betulae* on

Crataegus, 4 ♀, 2.vi.1964 (*Talitzki*); Kishinev, ex *Pulvinaria betulae*, 8 ♀, 1.vi.1964 (*Talitzki*). U.S.S.R., ?UZBEKISTAN: Agashik, ex *Pulvinaria betulae*, 4 ♀, 9.viii.1928 (*Archangelskaja*), in ZI, Leningrad.

THE *ACUTUS*-GROUP

Eunotus acutus Kurdjumov (Text-figs 16, 22-23)

Eunotus acutus Kurdjumov, 1912 : 330-331, figs 1A-D, 3A-B. LECTOTYPE ♀, UKRAINIAN S.S.R.: Poltava (ZI, Leningrad), here designated [examined].

According to a personal statement by the late M. N. Nikolskaja, all that was left of the Kurdjumov collection at the Experimental Station in Poltava, where he worked, was transferred to the Zoological Institute in Leningrad about 40 years ago. The only type-material of *E. acutus* consists of two specimens. One syntype is in bad condition (most of thorax only left) and labelled '13/46'; the other one, a female in good condition, is selected here as lectotype. It is labelled '13/45' and, probably in Kurdjumov's handwriting, '*Eunotus acutiventris* Kurdj.'. He probably changed the name in the manuscript, as may be guessed also from the apparent derivation of the name from the gaster which he described in the key as 'acute angled at the tip'. It fits the description well and agrees exactly with one of the smallest specimens from Bohemia. The body-size varies in females from 1-1.5 mm, in males 0.85-1.2 mm.

The females can be recognized rather easily on the characters given in the key above, but the males are very similar to those of *E. parvulus* Masi and, to some extent, also to *E. nigriclavis* (Förster). In the former two species I have found also a rather wide range of variation and the rather slight differences mentioned in the key above proved only more or less reliable. The figures obtained by careful measurement often overlap. For example, among more than 20 males of *E. acutus* (reared with the females) the ratio of the breadth of the frons and the breadth of the eye is 1.34-1.5 : 1, whilst in 18 males of *E. parvulus* (mostly British and North European specimens) it is 1.08-1.35 : 1. Otherwise in *E. parvulus* the vestiture of the eyes seems to be generally longer, more conspicuous. I have not found any good character in the relative lengths of the fore wing veins, in scutellum (which seems, however, to be relatively broader in *E. parvulus*), or in propodeum, thoracic pleurae, etc. In some males of *E. parvulus* the scapus is more attenuate distally, but in some others it is not. In both species the thoracic dorsum is rather dull. In the females of *E. nigriclavis* it is shinier, and the scutellum is slightly more convex.

BIOLOGY. The records from the fresh material together with information published earlier list the following Coccids as hosts: *Acanthococcus greeni* (Newstead) (Kurdjumov, 1912), *Rhizococcus agropyri* Borchsenius (n. rec.) and *Greenisca placida*

(Green) (n. rec.). The parasite seems to be closely associated with grasses, mainly with *Agropyrum* species in xerothermic habitats.

DISTRIBUTION. Poland, Czechoslovakia, Ukrainian S.S.R.

MATERIAL EXAMINED.

Type-data given in synonymy.

POLAND: Poznań-Bebice, ex *Rhizococcus agropyri* on 'low grass', 5 ♀, 1 ♂, vii.-xi. 1967 (Lewandowski). CZECHOSLOVAKIA: Bohemia, Hazmburk Hill near Libochovice, 1 ♀, 2.vi.1943 (Hoffer); Praha-Ruzyně, 1 ♀, 22.v.1953 (Bouček); Karlštejn, ex *Greenisca ?placida*, 60 ♀, 34 ♂, 1957-58 (Hoffer); Prachatice, 1 ♀, 30.viii.1950 (Hoffer); Moravia, Hostýn, ex *Greenisca placida*, 5 ♀, 1 ♂, 1957 (P. Stary).

Eunotus nigriclavus (Förster)

Megapelte nigriclavus Förster, 1856 : 66. Holotype ♀, GERMANY: Aachen (NM, Vienna) [examined].

The material mentioned below has been compared with the type of *E. nigriclavus* in Vienna. The form of the antennal clava does not seem to be such a good character as Masi thought. Although in this and the following species the clava is usually stouter than in any other species, in all species it has the ventral side deprived of longitudinal sensilla in place of the extended area of micropilosity and, in *E. nigriclavus*, appears usually slightly obliquely truncate in dry specimens.

BIOLOGY. Host not known. In central Europe *E. nigriclavus* occurs mainly in woods and montane regions.

DISTRIBUTION. Germany (West), Czechoslovakia, Yugoslavia.

MATERIAL EXAMINED.

Type-data given in synonymy.

CZECHOSLOVAKIA: Bohemia, Krkonoše Mts, Černá Hora, 1200 m, 1 ♀, ix.1949 (Hoffer); Nový Hradec Králové, 250 m, 1 ♀, 6.viii.1958 (Bouček); Hůrka v Pošumaví, 1 ♀, 17.vii.1954 (Hoffer); Šumava Mts, Horní Sněžná, 1000 m, 1 ♂, 15.vii.1946 (Hoffer); Moravia, Javořice, 800 m, 1 ♀, 7.viii.1944 (Hoffer). YUGOSLAVIA: Dalmatia, Biograd na moru, 1 ♂, 14.vii.1968 (Bouček).

Eunotus merceti Masi

Eunotus merceti Masi, 1931 : 424, 433-435, fig. 2. Holotype ♀, SPAIN: El Pardo (IEE, Madrid) [examined].

Very similar to *E. nigriclavus* but differing mainly in the fore wing venation. Only one female known.

BIOLOGY unknown.

DISTRIBUTION. Spain.

Species sola

Eunotus parvulus Masi

Eunotus (*Eunotellus*) *parvulus* Masi, 1931 : 424, 435-437, figs 3a-d, ♂♀. LECTOTYPE ♀, AUSTRIA: Wimpassing (NM, Vienna); here designated [examined].

Eunotus (*Eunotellus*) *aquisgranensis* Masi, 1931 : 424, 437-438. Holotype ♀, W. Germany: Aachen (NM, Vienna) [examined]. **Syn. n.**

Out of 1 ♀ and 4 ♂ of the original material of *E. parvulus*, 1 ♂ from Bohemia and 1 ♀ from Austria were designated by Masi as 'types'. Graham (1969 : 74) overlooked Masi's practice in designating types representing both sexes and mentions only the male as 'type' (and the other specimens as paratypes). I select the female as lectotype, as males of this species are not always safely recognizable.

Masi (1931) regarded *E. parvulus* and *E. aquisgranensis* as two different species, mainly on the difference in the relative lengths of the marginal and stigmal veins. I have found this character unreliable and have failed to find others. In 7 females examined the marginal vein is from 1.34 to 1.64 times as long as the stigmal vein, in another female (from Sweden) 1.8. The males are not always safely identifiable and that is why I measured only the specimens from Britain, where the occurrence of another similar species really is minimal. In 10 males the marginal vein showed ratio towards the stigmal vein between 1.6 and 2.1. The figures seem to be higher than in the females, but oddly enough among the females the highest figure, 1.64, is shown again by a British specimen. A similar finding, though in one female only, led Graham (1969 : 74) to regard his specimen as *E. aquisgranensis*.

DISTRIBUTION. Britain, Sweden, Germany (West), Austria, Czechoslovakia.

NEW RECORDS. BRITAIN: Esher Common, Surrey, 3 ♂, 21.vi.1970 (*Bouček*); Chobham Common, 1 ♀, 2 ♂, 19.vi.1970 (*Bouček*); Bald Hill nr Lewknor, Oxfordshire, 4 ♂, 13.vi.1970 (*Bouček*); Wytham Wood, Berkshire, 1 ♂, 26.vi.1964 (*Bouček*; published as *Eunotus* sp. in *Bouček*, 1965 : 83). SWEDEN: Västerbotten, Norsjö, 1 ♀, 5.vii.1956 (*Sundholm*); Blekinge, Sjöarp, 1 ♀, 12.vii (*Hedqvist*). CZECHOSLOVAKIA: Bohemia, Křesín nr Libochovice, 1 ♀, 31.vii.1943 (*Hoffer*); Praha-Chuchle, 1 ♂, 1 ♀, 24.vi.1955 (*Bouček*); Slovakia, Slov. Nové Mesto, Piliš Hill, 1 ♀, 31.v.1952 (*Hoffer*); Somotor, 1 ♀, 1.vii.1952 (*Kocourek*). AUSTRIA: 'Wimpacs' (=Wimpassing), Leitha Mts, 1 ♀, 20.vii.1915 (*Ruschka*), NM, Vienna.

MISCOGASTERINAE

Susteraia gen. n.

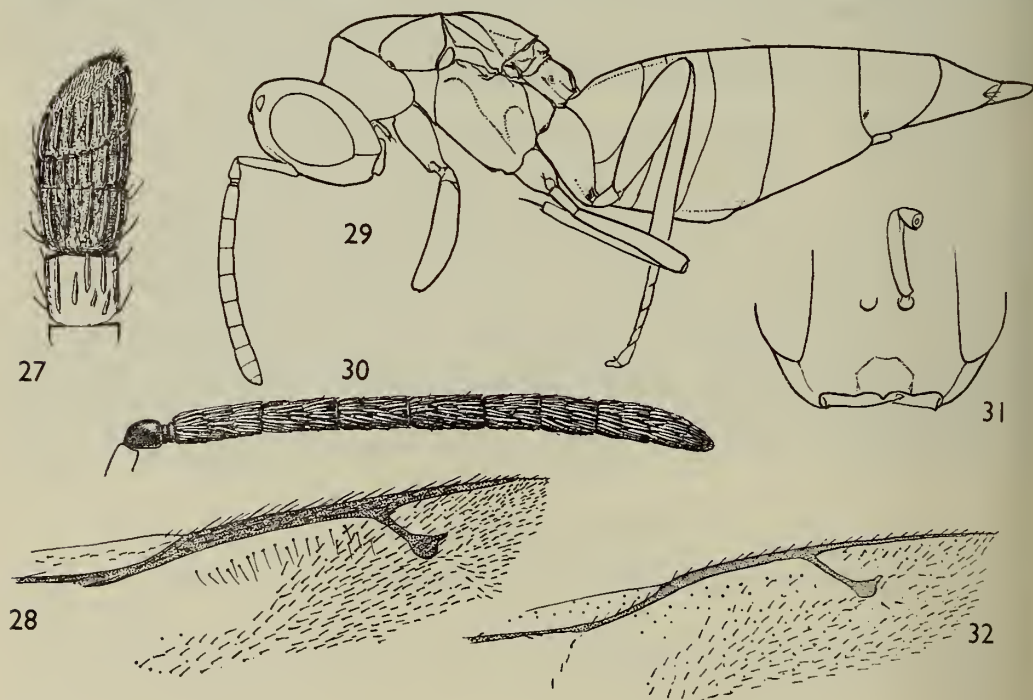
(Text-figs 29-32)

Type-species: *Susteraia acerina* sp. n.

Body metallic. Head and thorax very finely raised-reticulate, pilosity inconspicuous. Occiput not margined, temples and genae terete. Scrobes shallow. Lower face not protuberant. Clypeus very finely reticulate-punctulate, subtrapezoidal, weakly transverse, its

upper margin indicated by impressed line, diverging lateral margins slightly raised below, lower margin with distinct tooth in the middle, broadly emarginate on either side (Text-fig. 31). Malar space not concave. Mandibles with lower margin lamelliform at base, margin nearly straight. Labio-maxillary complex normal in both sexes. Antennae inserted near centre of face, well above lower ocular line, in both sexes 13-segmented, filiform, with two anelli, all funicle segments in female elongate, decreasing in length, the first longer than the pedicellus; clava with both sutures nearly perpendicular. In male antenna similar, though slightly longer, each funicle and clava segment with several dense irregular rows of sensilla linearia but otherwise nearly bare, with sparse microscopic semidistant hairs (Text-fig. 30).

Thorax fairly convex and elongate (Text-fig. 29). Pronotum rounded, rather short medially, lateral panels shallowly concave. Notauli complete, broad and deep, on bottom smooth between crenulae, as well as the axillar furrows which meet the mesoscutum well inside of notauli. The scuto-scutellar suture fairly sinuate. Scutellum elongate, convex, broadly meeting mesoscutum, frenal groove straight, in $3/4$ of scutellum, frenum more coarsely reticulate than the disc; axillulae distinctly separated, bearing some longitudinal rugae. Dorsellum convex, shallowly alutaceous. Propodeum transversely strongly convex, posteriorly deeply emarginate, foramen bordered by high reflexed carina which extends to smooth crescentic nuchal strip in the middle; median carina fine, as long as frenum; plicae and nucha absent; spiracles of medium size, elliptical, removed from anterior margin; part behind them deeply depressed down to narrow supracoxal flange; callus convex, generally with one row of weak hairs. Prepectus broad, reticulate, without oblique carina, groove-like along upper and hind edge near tegula. Mesepisternum reticulate, on ventral side with some hairs, epimeron mainly smooth, at least above, in middle with asymmetrically arched groove. Metacoxa reticulate,



FIGS 27-32. 27-28. *Semiotellus rujanensis*. 27, apex of ♀ antenna; 28, fore wing venation. 29-32. *Susteraiia acerina*. 29, body of ♀ in lateral view; 30, ♂ flagellum with pedicellus; 31, head of ♀ in facial view; 32, fore wing venation in ♀.

bare dorsally, laterally broadly depressed. Legs slender, hind tibia with two spurs. *Fore wing* with slender venation (Text-fig. 32), without hyaline break at end of parastigma; marginal vein about twice the stigmal and slightly shorter than the postmarginal; stigma small; pubescence weak, not dense, marginal ciliae short, basal fold with some hairs, basal cell bare and open below as well as speculum which extends far below marginal vein.

Gaster in female long and strongly compressed from sides, hypopygium reaching about one-third along, its tip emarginate. Petiole extremely short, in middle linear. First tergite short, its hind margin weakly emarginate in the middle; second tergite the shortest, the sixth the longest, about 1.5 times as long as epipygium which is rather large, unusually high in lateral view (Text-fig. 29), cerci at its lower margin in apical fifth, their bristles short. Ovipositor shortly protruding. Gaster finely transversely alutaceous, on sides and at apex with inconspicuous dark hairs. Male gaster narrow and short; petiole moderately transverse, smooth.

Named in honour of my old friend and teacher, Mr O. Šustera of Prague, a hymenopterist, who more than 60 years ago proposed the first reasonable basis for the taxonomy of the European Pompilidae.

Susteraia gen. n. belongs to Miscogasterinae, tribe Miscogasterini and in Graham's key to genera (1969 : 150–155) it may be easily keyed out by inserting the following paragraphs instead of 18 (17):

- 18 (17) Antennae short, in ♀ combined length of flagellum plus pedicellus less than, in ♂ at most equal, to the breadth of head; pedicellus longer than the first funicle segment; lower margin of clypeus laterally excised, in the middle with a broad tooth accompanied on either side with another weaker tooth; interantennal space convex, much broader than diameter of torulus. **NODISOPLATA** Graham
- Antennae much longer, flagellum plus pedicellus much longer than breadth of head; pedicellus shorter than first funicle segment; clypeal margin shallowly emarginate laterally and with a simple, rather sharp tooth in the middle; interantennal space not broader than torulus 18a
- 18a (18) Mid lobe of mesoscutum and scutellum flat; scutellar disc delimited by axillular furrows and frenal furrow subquadrangular, with sides nearly parallel, surface delicately engraved-reticulate; gaster not long, dorsally flat, not compressed from sides; propodeum smooth or nearly so, median carina indistinct, petiolar margin low **KSENOPLATA** Bouček
- Mid lobe of mesoscutum and scutellum very distinctly convex, sides of scutellum clearly converging forward, the disc densely reticulate, not shiny; gaster long, in ♀ distinctly compressed from sides; propodeum reticulate-rugulose, with distinct median carina **SUSTERAIA** gen. n.

Susteraia acerina sp. n.

(Text-figs 29–32)

♀. Body mainly vivid cupreous, head and thorax in places slightly violaceous, thoracic pleurae and gaster basally red to golden, gaster dorsally and posteriorly mostly dark purple. Scapes, pedicels, mouth parts, tegulae and legs apart from coxae, reddish testaceous; tarsi paler except apex. Wings hyaline, venation testaceous. Length 3.8–4.1 mm.

Head 1.16 times as broad as mesoscutum, dorsally twice as broad as long, with temples hardly one-third as long as eyes, rounded, receding. POL about 2.1 times OOL. In facial view head about 1.26 times as broad as high. Lower face at mouth margin with 6 longish hairs, which are about three times as long as the normal inconspicuous pubescence. Relative measure-

ments: head width 58, height 46.6, frons width 31, eye 30.5 : 22, malar space 9, width of mouth 27, length of scape 21, pedicellus plus flagellum 82. Pedicellus dorsally twice as long as broad, first funicle segment 2.1 times, the fifth 1.4 times, the sixth 1.1 times as long as broad; clava hardly longer than two preceding segments together.

Thorax dorsally (collum not measured) about 1.7 times as long as breadth of mesoscutum. Pronotum without conspicuous smooth belt at hind margin, which is thin. Mid lobe of mesoscutum fully as long as broad. Scutellum, if axillulae excluded, about 1.3 times as long as broad. Propodeum extremely finely rugulose-reticulate, sublaterally from hind margin with a few longitudinal rugae; hind corner above coxa with a lobate supracoxal lamina. Fore wing relative measurements: length 184, width 70, subcostal cell 70 : 6, marginal vein 34, postmarginal 41, stigmal vein 17, distance between upper margin of stigma and postmarginal vein 9. Lower surface of costal cell with one row of hairs, sometimes narrowly interrupted in middle, doubled apically (Text-fig. 32).

Gaster very narrow, 1.4–1.45 times as long as head plus thorax combined (Text-fig. 29).

♂. Golden-cupreous, only gaster posteriorly dark purplish; flagellum beneath ochreous; scapus and legs except metallic coxae, pale testaceous. Length of body 2.8 mm. Relative size of eye 24 : 18, scapus 14 : 4, flagellum plus pedicellus (Text-fig. 30) 79, i.e., nearly 1.65 times the width of head. Pedicellus dorsally 1.2 times as long as broad, half as long as first funicle segment which itself is 2.5 times as long as broad, the sixth 1.6 times as long as broad, clava as long as two preceding segments combined. Fore wing slightly broader than in female, 134 : 57, relative length of marginal vein 27, postmarginal 29, stigmal vein 15, distance between stigma and postmarginal vein only 1.9 times the height of stigma. Gaster narrow, slightly shorter than thorax.

BIOLOGY. After receiving the specimen reared in the Ukraine, with the suggestion that it might be a parasite of a weevil in maple seed, I mentioned the matter to my colleague Dr Strejček, a keen coleopterist working mainly on Curculionidae. He collected various samples of seeds and actually succeeded in rearing one male of the parasite, but no species of the Curculionid genus *Bradybatus* which we presumed to be the host. It is possible, however, that the *Bradybatus* species leave the maple seed earlier, or that the damaged seed falls earlier as does the seed of *Sorbus* attacked by *Megastigmus brevicaudis* Ratzeburg (Hym., Torymidae). The taxonomic affinity of *Susteraia acerina* cannot exclude also a possibility that a Dipteron is the host, as may be suggested by a nice *Torymus* species reared from the same lot of maple seed.

Holotype ♀. CZECHOSLOVAKIA: Bohemia, Starkoč near Náchod, vii.1955 (J. Macek); in Bouček Collection.

Paratypes. CZECHOSLOVAKIA: Bohemia, Praha-Krč, ex seed of *Acer pseudo-platanus*, 1 ♂ (allotype), ii.1969 ex seed collected xii.1968 (Strejček). UKRAINIAN S.S.R.: Kiev, Botanical Garden, ex ?weevil in seed of *Acer pseudoplatanus*, 1 ♀, 13.iii.1968 (M. Zerova).

SEMIOTELLUS Westwood

(Text-figs 27, 28)

Semiotus Walker, 1834 : 288, 290. Type-species: *Semiotus mundus* Walker; designated by Westwood, 1839. [Homonym of *Semiotus* Eschscholtz, 1829.]

Semiotellus Westwood, 1839 : 70. [Replacement name for *Semiotus* Walker.]

Semiotellus rujanensis sp. n.

(Text-figs 27, 28)

Semiotellus sp. indet., Graham, 1969 : 254, 255, ♀.

♀. Bluish green; the following parts testaceous: knees, fore tibiae, narrow apices of mid and hind tibiae, tarsi except at apex. Wings hyaline, venation dark brown. Length 3.4–3.5 mm.

Head 1.1 times as broad as mesoscutum, in dorsal view about twice (in holotype 2.06 times) as broad as long, in facial view 1.27 times as broad as high. Piliferous punctures coarse, very distinct, numerous, but wanting laterad of paired ocelli, in front of median ocellus and on lower face dorsad and laterad of clypeus. POL 1.7 times OOL. Area between clypeus and antennae rather protuberant but not very convex transversely, separated from clypeus by deep furrow between the very deep large tentorial pits. Clypeus slightly transverse, minutely reticulate, its lower margin slightly arched, produced. Mandible 2-toothed, the upper edge of upper tooth broad, nearly straight, not notched. Malar space with deep fovea just behind upper end of malar sulcus. Relative width of frons 42, of head 65, eye 29 : 21, malar space 15, width of mouth 32, scape length 23, flagellum plus pedicellus 63. Scapus laterally 3.7 times as long as broad; pedicellus dorsally 1.6 times as long as broad, slightly longer than first funicle segment; basal funicle segments slightly elongate, the fifth subquadrate; flagellum moderately clavate, the segments slightly increasing in width up to second claval segment; clava in lateral view (Text-fig. 27) 2.4 times as long as broad, dorso-apically subtruncate, bearing here an extensive slightly convex area of micropilosity; the first claval suture perpendicular, the second distinctly oblique.

Head and thorax with inconspicuous, usually short, mainly dark pubescence, in spite of broad and very distinct piliferous punctures; the latter sparser on disc of mid lobe of mesoscutum and nearly absent from posterior half of scutellum. Apex of scutellum raised in middle. Propodeum medially one quarter the length of scutellum, steeply elevated into median ridge (rather than carina), all over finely reticulate, with some rather fine irregular rugae; plicae distinct, straight; spiracle large, its diameter equal to breadth of the lateral smooth strip of metanotum. Basal cell of fore wing bare, basal and cubital folds also nearly bare, with at most one hair. For venation see Text-fig. 28. Relative length of marginal vein 42, postmarginal 25, stigmal vein 13, distance of the slightly enlarged stigma from postmarginal vein about 1.7 times its height.

Gaster slightly longer and distinctly broader than thorax, itself about 1.6 times as long as broad. First tergite nearly as long as three following tergites combined. Pubescence of gaster mainly dark, relatively short, also bristles of cerci subequal in length. Epipygium in median line hardly longer than median length of sixth or fifth tergite.

♂. Not known.

BIOLOGY not known. Collected by sweeping in mixed forest.

Holotype ♀. EAST GERMANY: Isle of Rügen, Baabe, vii.1960 (Bouček); presented to BMNH.

Paratype. 1 ♀, collected with the holotype; in NM Prague.

Named after Rügen=Rujana, old Slavonic name of the Isle.

This is the most distinctive species of the genus, differing from all other European species mainly by the large body with extremely short pubescence on head and thorax, the antenna with large area of micropilosity in female, rather short gaster and not having one cercal bristle unusually long. Graham (1969 : 254, 255) mentions this species as 'sp. indet.' and states that the area of micropilosity is on ventral face of the clava (as it is commonly in Pteromalidae), while it is in fact placed dorso-apically.

PTEROMALINAE

VELTRUSIA gen. n.

Type-species: *Veltrusia rara* sp. n.

Occiput not margined, temples and genae terete. Eyes with extremely fine inconspicuous hairs. Scrobes fairly deep but not sharply delimited though slightly angulate in front of ocellus; interantennal callus distinctly raised and extending into scrobes and towards clypeus. Lower face not protuberant. Clypeus mainly minutely reticulate, smooth at lower margin, subhexagonal: upper margin finely groove-like, short, horizontal, then obliquely descending to moderately deep tentorial pits, then converging downwards as broad shallow grooves; lower margin arched, slightly produced. Mouth margin sublaterally simple, arched; malar space convex. Left mandible 3-toothed. Lower edges of antennal toruli in lower ocular line. Antenna in female 13-segmented, with two anelli; pedicellus hardly longer than first funicle segment; funicle filiform, with segments decreasing in length; clava slender, bluntly pointed, both sutures perpendicular. Flagellum with pubescence short, inconspicuous, each segment of funicle and clava with one row of sensilla.

Thorax elongate, not depressed, dorsally as well as head mainly rugose-reticulate, clothed with distinct and fairly dense dark hairs. Pronotum narrower than mesoscutum, collar sharply margined, hind margin emarginate with broad smooth belt; lateral panel shallowly concave, relatively broad. Notaular furrows complete, moderately deep. Scutellum broadly meeting mesoscutum, axillar furrows intercepted well inside of notauli; frenal furrow rather deep but irregular, wavy; frenum taking up apical quarter, its sculpture coarse longitudinal, raised reticulation; furrows of axillulae diverging, anteriorly deep, weak posteriorly. Dorsellum forming transverse crest behind basal crenulae, its posterior face reticulate. Propodeum reticulate, with coarse rugae in deep places; median carina rather irregular though high and raised anteriorly into a triangle which is blunt at top; plicae sharp, arched, slightly converging and high posteriorly; nuchal strip crescentic, irregular but distinct, separated from disc by deep cross-furrow with coarse crenulae; hind corner formed by sharp vertical irregular edge; pubescence of callus moderately long, not dense, whitish; supracoxal flange not conspicuous. Metapleura, mesepisternum and lower epimeron reticulate, upper epimeron smooth and reaching far down along the vertical subdividing furrow which is more fovea-like above where it turns towards metapleura. Prosternum with mesolcus. Hind coxa reticulate, dorsally bare. Hind tibia with outer spur only half as long as the inner one. Legs relatively slender, basitarsi generally as long as two following segments combined. Fore wing pubescence dense on disc, marginal fringe short; basal fold hairy, cubital fold hairy except at proximal half of basal cell, the latter also with a few hairs below submarginal vein and on disc; speculum broad but closed below (Text-fig. 34). Veins slender, marginal vein subequal to the postmarginal and nearly twice as long as the straight stigmal vein; the latter hardly knobbed. Parastigma rather stout, ending in a pale break.

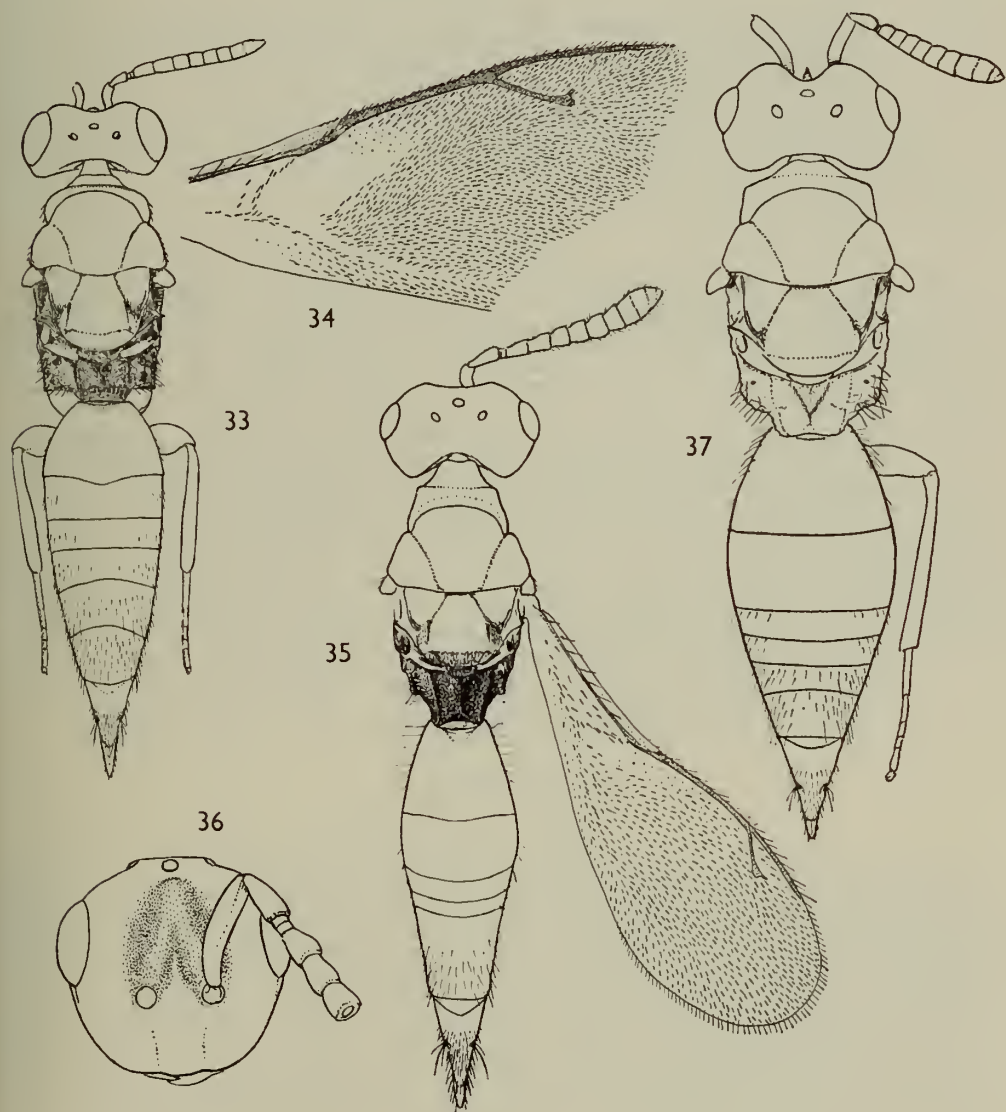
Gaster of female long, convex, lanceolate, posteriorly and laterally with dark hairs. Petiole very short, hidden, nearly smooth. First tergite moderately long, its hind margin subangularly produced in median two-quarters; tergites 2 to 4 subequal (Text-fig. 33), with hind margins nearly straight, the fifth tergite slightly longer than the fourth, the sixth still longer; one bristle of cercus slightly but not unusually longer. Ovipositor sheaths very slightly protruding. Hypopygium not reaching middle of gaster.

♂. Unknown.

Named after Veltrusy, a little town with old parkland in Bohemia, north of Prague, where the type-species and the two following new species (of *Strejcekia* gen. n.) were collected.

This is another aberrant member of Pteromalinae and as such is not easy to place

in the existing keys, for, because of complete notauli, it runs in them (Bouček *in* Peck, Bouček & Hoffer, 1964; Graham, 1969) to Miscogasterinae. From the latter subfamily it differs in having the postmarginal vein as long as the marginal, and from most other genera by the pronotum which is rather short and carinate in the middle.



FIGS 33-37. 33-34. *Veltrusia rara*. 33, ♀ body; 34, part of fore wing. 35-36, *Strejcekia elegans*. 35, body of ♀ with fore wing; 36, head of ♀ in facial view. 37, *Strejcekia brevior*, body of ♀. (Hind margin of fifth tergite omitted in Fig. 35).

From most genera of Pteromalinae *Veltrusia* gen. n. differs in having the notauli clearly complete. In Graham's key it runs near to *Dorcatomophaga* Kryger, together with *Strejcekia* gen. n. described below. Both these new genera differ from *Dorcatomophaga* by several characters which may be summed up in the following way, altering the key by Graham on p. 360, couplet 4I (40).

- 4I (40) Notauli complete, distinctly impressed throughout except sometimes just at the hind margin of mesoscutum; hind corners of propodeum with vertical ridge jutting over the base of hind coxa, the corner in dorsal view usually sharp, rectangular or acute; gaster usually convex 41a
- Notauli almost always incomplete and reaching at most somewhat more than half way across the mesoscutum; very rarely traceable to its hind margin but then very superficial posteriorly, and propodeum not sharp-angled when viewed from above 42
- 41a (41) Pronotal collar with sharp carina; centres of antennal toruli above level of ventral edge of eyes; postmarginal vein about as long as the marginal; plicae of propodeum sharp and high, though slightly irregular; median carina raised to a tooth anteriorly **VELTRUSIA** gen. n.
- Collar rounded, without distinct carina; antennal toruli below the lower ocular line; postmarginal vein shorter than the marginal 41b
- 41b (41a) Antennal scrobes shallow, without subdividing median crest; lower face radiately striate and bearing only short, inconspicuous hairs; eye longer than malar space; pronotum in dorsal view not forming angular shoulders; marginal vein slightly thickened; propodeum shallowly reticulate-punctured, median carina and plicae obliterated; gaster alutaceous all over.
- DORCATOMOPHAGA** Kryger
- Scrobes deep and in lower half (or more) separated by the median crest; lower face not striate but clothed with conspicuous long hairs; pronotum in dorsal view with subrectangular shoulders, though much narrower than mesoscutum; marginal vein slender; propodeum very deeply reticulate-punctured, dull (Text-fig. 35), with high crest-like plicae and median carina, the latter raised and widened anteriorly; gaster at least anteriorly mainly smooth.
- STREJCEKIA** gen. n.

Veltrusia rara sp. n.

(Text-figs 33, 34)

♀. Black with dark green or dull bronze tinge, which is slightly more vivid on vertex and thoracic dorsum. Scapes and legs beyond coxae mainly brownish testaceous, femora more or less infuscate, trochantins and knees paler. Mandibles and palpi fuscous. Pedicellus fuscous, flagellum black. Wings subhyaline, veins brown. Length 4 mm.

Head fully 1.1 times as broad as mesoscutum, fully twice as broad as long (52 : 25) in dorsal view, with temples moderately receding, only one-fifth the length of eyes. POL to OOL as 11.5 to 6.5, lateral ocellus slightly nearer to the anterior one than to occiput; relative width of vertex 30, eye 25 : 19.5, malar space 14, mouth width 21, height of head 43, width 52. Inner eye orbits very slightly diverging downward. Scrobes above ending about one diameter from ocellus. Fine reticulation behind malar sulcus engraved, alutaceous. Relative length of scapus 22, flagellum plus pedicellus 60, i.e., 1.15 times width of head. Pedicellus dorsally twice as long as broad, distinctly narrower than funicle; both anelli combined about as long as broad; first funicle segment 1.5 times, the sixth 0.9 times as long as broad, clava 2.2 times as long as broad.

Thorax (Text-fig. 33) from collar margin down to apex of propodeum about 1.6 times as long as broad. Relative length of collar in the middle 4, at sides in dorsal view 12, length of mesoscutum in middle 30, scutellum 26. Mesoscutum finely transversely reticulate, with bases of hairs raised. Scutellum on disc minutely engraved-reticulate, with scattered piliferous punctures, part between axillulae and in front of frenum as long as broad, axillulae moderately sloping, rather broad. Propodeum medially half as long as scutellum, the raised nuchal strip confined to apical quarter. Oval spiracles removed by their longer diameter from metanotal margin. Fore wing relative length 154, width 61, costal cell 52 (width about 5), marginal vein 36, postmarginal 36, stigmal 20, distance between stigma and postmarginal vein 8. Lower surface of costal cell hairy, hairs proximally reduced to incomplete double line.

Gaster nearly 1.3 times as long as head plus thorax combined, 3.1 times as long as broad itself, broadest in basal third. First tergite slightly shorter than three following tergites combined, the fourth with hind margin slightly emarginate; first tergite smooth, laterally near base with a few hairs, the following tergites basally with obliterated alutaceous sculpture, the fifth and sixth slightly more distinctly engraved-reticulate with raised piliferous punctures (except at hind margin).

♂. Unknown.

BIOLOGY unknown. Judging from the taxonomic characters the species may be a parasite of xylophagous beetles, most probably of Anobiidae. The specimen, along with the two species of *Strejcekia* described below, was beaten from bushes and trees in an old park.

Holotype ♀. CZECHOSLOVAKIA: Bohemia, Veltrusy, 9.v.1959 (*J. Strejček*); in Bouček Collection.

Together with Dr Strejček and my assistant we have been trying to get some more material of these interesting forms, which seem to be very rare (hence the specific name), but without success. In the meantime I consulted various colleagues and we agreed that the three specimens, collected in one spot, on the same day, belong to two new genera and to three new species. It is only now, after more than ten years, that I am publishing their descriptions.

STREJCEKIA gen. n.

(Text-figs 35-37)

Type-species: *Strejcekia elegans* sp. n.

Body hardly metallic; head and thorax reticulate, reticulation mainly obliterated dorsally but very deep on propodeum; gaster nearly smooth. Head with eyes relatively small, their pubescence short, not conspicuous. Occiput not margined but with unusually coarse rugose reticulation; temples and genae terete. Scrobes not margined, rather deep; interantennal crest high, reaching narrowly far into scrobes and also downward, as convex supraclypeal area. Lower face not protuberant, distinctly hairy, not radiately striate. Clypeus very narrow, ill-defined above, its lower margin more or less produced and thin, surface not striate. Sub-lateral margins of mouth not sinuate. Mandibles small, normal, 3-toothed, upper tooth truncate. Antennae in female not very long (Text-figs 35, 37), 13-segmented, inserted below lower ocular line, not far below middle of face. Scapus slender, distinctly longer than eye; pedicellus longer than first funicle segment; two short anelli: flagellum weakly clavate, the six segments of funicle gradually decreasing in length, each segment narrowing basad and generally with one row of sensilla; three-segmented clava blunt at apex, with sutures almost perpendicular.

Thorax not depressed, elongate. Pronotum much narrower than mesoscutum, collar only bluntly set off (not carinaceous), in dorsal view with distinct angular shoulders, in middle short

but side panels rather long, shallowly concave. Notauli complete, not very shallow. Scuto-scutellar suture nearly straight, separated from scutellum by a cross-furrow. Scutellum reticulate, frenal furrow marked by deep bases of irregular longitudinal grooves of frenum. Dorsellum short, very deeply reticulate-punctured as is the propodeum, dull. Propodeum with broad, ridge-like median carina rising into a blunt tooth anteriorly and with more or less distinct, equally ridge-like, subparallel plicae; spiracles small, oval; part laterad and caudad of spiracle in addition to the reticulation coarsely and irregularly rugose; callus with irregular longitudinal ridge; hind corners of propodeum jutting over base of metacoxa and with a vertical ridge, but not nearly reaching level with the protruding median part of propodeum, which forms, however, no neck; no conspicuous supracoxal flange. Prepectus large, with distinct vertical ridge anteriorly, depressed on disc. Mesopleura and metapleura mainly deeply reticulate; mesepimeron with deep fovea above the middle, in front of fovea with a vertical strip of shallower sculpture. Hind coxa reticulate, dorsally bare. Legs fairly slender, hind tibia with only one distinct spur. Basitarsi of all legs long, dorsally fully as long as following two segments together. *Fore wing* moderately densely hairy, marginal fringe of medium length; costal cell unusually narrow; basal fold hairy but speculum open or closed below; veins slender, marginal vein at most as long as the postmarginal, much longer than the stigmal which is hardly knobbed.

Gaster in female (Text-figs 35, 37) convex, conically lanceolate, nearly smooth and only poorly pubescent posteriorly. Petiole short and mostly hidden under the propodeum, but with several coarse longitudinal rugae. Hind margins of tergites mainly straight, the first and second relatively large though not reaching middle of gaster. Epipygium not very long, with a group of denser short hairs in front of the cercus, which has one bristle conspicuously longer than the others. Ovipositor sheaths hardly protruding. Hypopygium reaching middle of gaster.

Males not known.

Named in honour of Dr J. Strejček of Prague, a keen entomologist working in nature conservation, to whom I am indebted for some very interesting material of Chalcids.

Strejcekia gen. n. also comes near to *Dorcatomophaga* Kryger and its distinguishing characters are summed up above along with *Veltrusia* gen. n.

KEY TO SPECIES

Females

- 1 Body slender (Text-fig. 35), thorax dorsally fully 2.3 times as long as breadth of pronotum; antennae longer, flagellum plus pedicellus combined about 1.4 times as long as breadth of head, funicle segments 1-4 not transverse; scrobes only moderately deep, not sharply delimited above and not reaching near to the median ocellus; interscrobial callus blunt, not very high (Text-fig. 36); median part of propodeum strongly protruding beyond posterolateral corners, the strong ridgelike plicae slightly longer than distance between them anteriorly . . . *elegans* sp. n. (p. 297)
- Body broader (Text-fig. 37), thorax dorsally only 1.9 times as long as breadth of pronotum; antennae shorter, stouter, flagellum plus pedicellus combined distinctly shorter than breadth of head; funicle segments 1-6 strongly increasingly transverse; scrobes very deep, abruptly ending about one diameter before ocellus, interscrobial crest narrow, high and sharp; median part of propodeum only slightly protruding beyond level of posterolateral corners (above base of coxa); weak plicae only about two-thirds as long as distance between them anteriorly. . . . *brevior* sp. n. (p. 297)

Strejcekia elegans sp. n.

(Text-figs 35, 36)

♀. Body black, dorsally with very slight dark green tinge. Legs, base of antennae and tegulae dark testaceous; flagellum except anelli fuscous, also coxae infuscate basally. Wings subhyaline, venation pale testaceous. Length 2.4 mm.

Head in dorsal view broader than mesoscutum as 35 : 30, than the pronotum as 35 : 22.5, itself 1.75 times as broad as long, with temples about three-quarters the length of eyes but rather strongly arcuately receding; occiput deeply emarginate, taking up slightly more than half the head breadth. POL equals OOL. Frons laterally strongly convex. Scrobes moderately deep, above ending nearly two diameters from the ocellus, but not well delimited. Inter-antennal callus (Text-fig. 36) blunt and fading out slightly above middle of scrobes. Eyes prominent though small, with distinct short pubescence. Relative measurements: head width 35, height 31, width of frons 26, oval eye 12 : 9, malar space 13.5, mouth width 20, distance between lower margin of clypeus and antennal toruli 11.5, scapus length 17, flagellum plus pedicellus 49, i.e., 1.4 times the width of head. Scapus reaching level with lower edge of median ocellus; pedicellus dorsally 2.4 times as long as broad and as long as anelli plus first funicle segment; both anelli together shorter than broad; first funicle segment with sensilla confined to distal half, basally constricted, about 1.5 times as long as broad; the fifth and sixth segment slightly transverse. Clava about 2.2 times as long as broad, apical nipple with small area of micropilosity.

Thorax measured from anterior margin of collar to apex of propodeum nearly 1.8 times as long as breadth of mesoscutum, fairly convex. Hind margin of pronotum smooth, deeply emarginate. Mesoscutum and scutellum distinctly hairy, fairly shiny as the reticulation is rather fine and shallow. Mid lobe of mesoscutum strongly convex, 1.1 times as broad as long. Scutellum slightly elongate, at apex subtruncate; frenum taking up more than apical one-quarter, coarsely longitudinally rugose; disc of scutellum nearly smooth, very finely alutaceous, with scattered fine piliferous punctures. Axillulae short, moderately sloping, dull, deeply reticulate. Dorsellum of metanotum dull, deeply reticulate-punctured as is the propodeum. Apex of protruding median part of propodeum emarginate, not margined; median ridge triangularly expanding and rising towards base; spiracle very small, round; lateral callus with a longitudinal crest, the hairs thin and not dense. Hind femur nearly 6 times as long as broad, clothed sparsely with thin and long hairs. Wings hardly exceeding apex of gaster. Fore wing narrow (Text-fig. 35), regularly rounded at apex, relative length 110, width 40, costal cell 43 : 3, marginal vein 25, postmarginal 20, stigmal vein 10. Lower surface of costal cell with only one row of hairs, this precurrent; submarginal vein smoothly joining parastigma; anterior margin of wing with marginal and postmarginal vein forming a smooth arch; stigmal vein angle about 45°, stigma very small, subtriangular, the short uncus almost parallel to postmarginal vein. Base of wing almost all hairy but hairs sparse, rather long; speculum very small. Hind wing relative length 85, width 19, longest fringe 3; fairly broadly rounded at apex.

Gaster narrower than mesoscutum, about 1.2 times as long as head plus thorax combined, itself 3.2 times as long as broad, smooth, posteriorly bearing some sparse long thin hairs.

♂. Not known.

BIOLOGY not known.

Holotype ♀. CZECHOSLOVAKIA: Bohemia, Veltrusy, 9.v.1959 (*Strejček*); in Bouček Collection.

Strejcekia brevior sp. n.

(Text-fig. 37)

♀. Black; propodeum and base and apex of gaster slightly brownish; scapes and pedicels

and legs apart from coxae mainly pale testaceous, pedicels and femora slightly infusate. Wings subhyaline, venation light brown. Length 2.7 mm.

Head slightly broader than mesoscutum (as 42 : 38; Text-fig. 37), in relation to pronotum as 42 : 31, itself in dorsal view 1.75 times as broad as long, with temples about 0.7 the length of eyes. POL to OOL as 11 : 8. Frons on sides strongly protuberant, rounded; scrobes deep, narrowing above and there in the middle angulately delimited, only about one diameter in front of ocellus; interscrobal crest narrow, high, sharp up to half of scrobes, more dorsally much lower but still distinct. Lower face below antennal toruli subhorizontally rugose-striate, irregularly rugose nearer to mouth. Also gena dull, deeply irregularly rugulose, malar sulcus below replaced by a blunt ridge. Relative measurements: width of head 42, height 36, width of frons 30, oval eye 15 : 11, malar space 17, mouth width 18, scapus length 18, flagellum plus pedicellus 37, i.e., 0.88 the head width. Pedicellus dorsally hardly 1.5 times as long as broad; first funicle segment about 1.5 times, the sixth about twice as broad as long; clava less than twice as long as broad.

Thorax dorsally from anterior corners down to apex of propodeum 1.57 times as long as breadth of mesoscutum. Sculpturally similar to *S. elegans* but all parts shorter, broader (hence the specific name); scutellar frenum posteriorly reticulate; mid lobe of mesoscutum only weakly convex, anteriorly cross-striate-alutaceous; notauli shallower but clear-cut down to scuto-scutellar suture. Scutellum as long as its maximum breadth measured between axillulae. Dorsellum truncate when seen from in front or from behind, with sublateral parts rather high. Propodeum in middle two-thirds the length of scutellum, median carina in anterior two-thirds replaced by large triangular blunt tooth the apex of which is in line connecting the posterolateral corners of propodeum; these blunt in dorsal view but formed by short, vertical ridge. Callus inconspicuously hairy. Hind femur 5 times as long as broad, dorsally with short pubescence, only on lower edge at apex with some longish hairs. Forewing relative measurements: length 112, width 41, costal cell 44, marginal vein 24, postmarginal 24, stigmal vein 11. Basal cell bare; speculum of medium size, reaching broadly cubital hair-line; posterior corner of fore wing blunt but distinct, at level with stigmal vein, apex of wing thus asymmetrically rounded, more strongly so anteriorly than posteriorly (unlike in *S. elegans*).

Gaster as broad as mesoscutum, 1.12 times as long as head plus thorax combined, itself about 2.2 times as long as broad. First tergite the longest, anteriorly on sides with a loose patch of longish hairs, apex of gaster with relatively short hairs, epipygium with very short hairs; second tergite shorter than the first as 16 : 22, but nearly as long as three following tergites (3-5) together.

♂. Not known.

BIOLOGY not known, but as in the preceding species, the morphological affinity suggests parasites of xylophagous beetles, probably with some rather cryptic way of life, as may be judged from the relatively small eyes and, at least in *Strejcekia elegans* sp. n., from the rather long and thin hairs on the gaster.

Holotype ♀. CZECHOSLOVAKIA: Bohemia, Veltrusy, 9.v.1959 (*Strejček*); in Bouček Collection.

RHIZOMALUS gen. n.

(Text-figs 41, 42)

Type-species: *Rhizomalus cupreus* sp. n.

Head and thorax very finely and densely, but shallowly, reticulate, very shortly and fairly densely hairy, piliferous punctures very distinct. Head in dorsal view moderately transverse; occiput slightly emarginate, not margined; frons convex, scrobes distinct but not very deep

Lower face not protuberant, finely radiately reticulate to striate (Text-fig. 41); genae convex, posteriorly rounded. Clypeus small, tentorial pits and upper margin not distinct, the lower margin truncate. Left mandible 3, the right 4 teeth, not large, moderately curved. Antennae in both sexes rather short, 13-segmented, inserted slightly above lower ocular line but below centre of face. Scapus hardly broadening distally, sublinear, not nearly reaching median ocellus; pedicellus longer than first funicle segment; two short anelli; flagellum rather stout, sublinear, all funicle segments transverse, almost equal in length, each with one row of longitudinal sensilla, in ♀ very shortly haired, hairs longer in ♂; clava ovate, bluntly pointed, its sutures perpendicular, micropilosity area reduced to terminal nipple.

Pronotum rather short, collar in middle sharply carinaceous; in dorsal view not forming shoulders on sides. Mesoscutum with notauli indicated as superficial lines on anterior half; scuto-scutellar suture weakly sinuate laterally. Scutellum slightly convex, frenal groove barely perceptible. Metanotum linear. Propodeum very short, finely rugulose-reticulate, transversely convex; nucha represented by a narrow elevated strip; median carina vague or weak, plicae absent; callus sparsely hairy; spiracles small, short-oval, removed from metanotum by more than their diameter. Prepectus small, triangular, weakly reticulate, anteriorly without carina. Mesepimeron with distinct arched subdividing furrow, upper epimeron smooth, the lower more strongly reticulate than outer surface of hind coxa; the latter dorsally bare. Legs rather stout, hind femur only slightly more than 3 times as long as broad; hind tibia longer than femur, with one spur; mid tibia with spur longer than width of tibia at apex, slightly shorter than basitarsus dorsally. Fore wing pilosity dense and very short (Text-fig. 40), marginal ciliation developed throughout; costal cell broad; parastigma slightly thickened and distally with a pale break; marginal vein very slightly thickened, hardly shorter and much broader than the postmarginal, slightly longer than the stigmal vein; the latter with small stigma. Basal cell mainly open below but more or less hairy at the basal hair-line; speculum not reaching marginal vein, mostly open below.

Gaster sublanceolate, dorsally mostly depressed. Petiole very short, hidden, smooth. Basal tergite with hind margin mainly entire. Bristles of cerci subequal in length to the normal pilosity. Ovipositor not exerted. Tip of hypopygium situated about half way along the gaster.

In male, mouth with labiomaxillary complex and legs normal, as in female.

The genus *Rhizomalus* seems to be nearest to *Hobbya* Delucchi and *Cecidostiba* Thomson, both morphologically and biologically. In Graham's key to the genera of the European Pteromalinae (1969 : 353-409) the female runs to couplet 132 and may be keyed out there in the following way.

- 132 (131) Fore wing broadly suffusedly infumate below marginal vein, the latter slightly thickened, shorter than the postmarginal and little longer than the stigmal vein; stigma very small; basal cell hairy in distal quarter or more. Propodeum short, plicae indistinct. Antennae very short, all funicle segments transverse; pedicellus about twice as long as the first funicle segment **RHIZOMALUS** gen. n.

- Fore wing hyaline or with different fuscous markings; marginal vein not thickened and not shorter than the postmarginal vein; basal cell usually bare; stigma either relatively large or propodeum about half the length of the scutellum. Antennae much longer, basal segments at least slightly elongate 132a

- 132a (132) Here Graham's couplet 132, keying out *Cecidostiba* Thomson and *Nephelomalus* Graham

The male runs in Graham's key to couplet 128 (p. 404), partly to *Pegopus* Förster, but differs from that genus as follows.

- a Antennae short, scapus not nearly reaching the ocellus, all funicle segments distinctly transverse; left mandible 3-toothed **RHIZOMALUS** gen. n.
- Antennae not so short, scapus reaching to the level of vertex, funicle segments subquadrate or slightly elongate; both mandibles 4-toothed **PEGOPUS** Förster

Rhizomalus cupreus sp. n.

(Text-figs 41, 42)

♀. Cupreous; head and thoracic dorsum more reddish, gaster basally more brownish metallic, apically purplish. Antennal base including anelli, then trochanters, knees, tibiae and tarsi testaceous; antennal flagellum blackish brown; coxae concolorous with thorax, femora extensively fuscous with metallic tinge, sometimes also tibiae slightly infusate or gaster beneath brownish. Fore wing, except for subhyaline basal third, more or less yellowish to brownish infumate, more distinctly so on disc below marginal and stigmal vein; venation brown. Hairs on thoracic dorsum mainly dark. Length 2.4–3 mm.

Head distinctly broader than mesoscutum (51 : 44), in dorsal view 1.9 times as broad as long, i.e., rather stout, with temples moderately receding and hardly one-third as long as eye. POL 1.35 times OOL; ocellar triangle 2.2 times as broad as high. Eyes not prominent, with extremely short sparse hairs. Supraclypeal area slightly convex but not well delimited. Clypeus flat, depressed, more strongly receding towards mouth than the adjoining face, its lower margin smooth. Mouth margin thin, regularly arched. Relative measurements: head width 51, height 42, width of frons 35, eye 23 : 17.5, malar space 14, width of mouth 25, distance between upper edge of antennal toruli and median ocellus 20, flagellum plus pedicellus combined 39, i.e., 0.77 the head width. Pedicellus dorsally about 1.7 times as long as broad; flagellum hardly clavate (Text-fig. 41); first funicle segment 1.05–1.2 times as broad as long, the sixth about 1.6 times as broad as long; clava as long as 2.5 preceding segments combined.

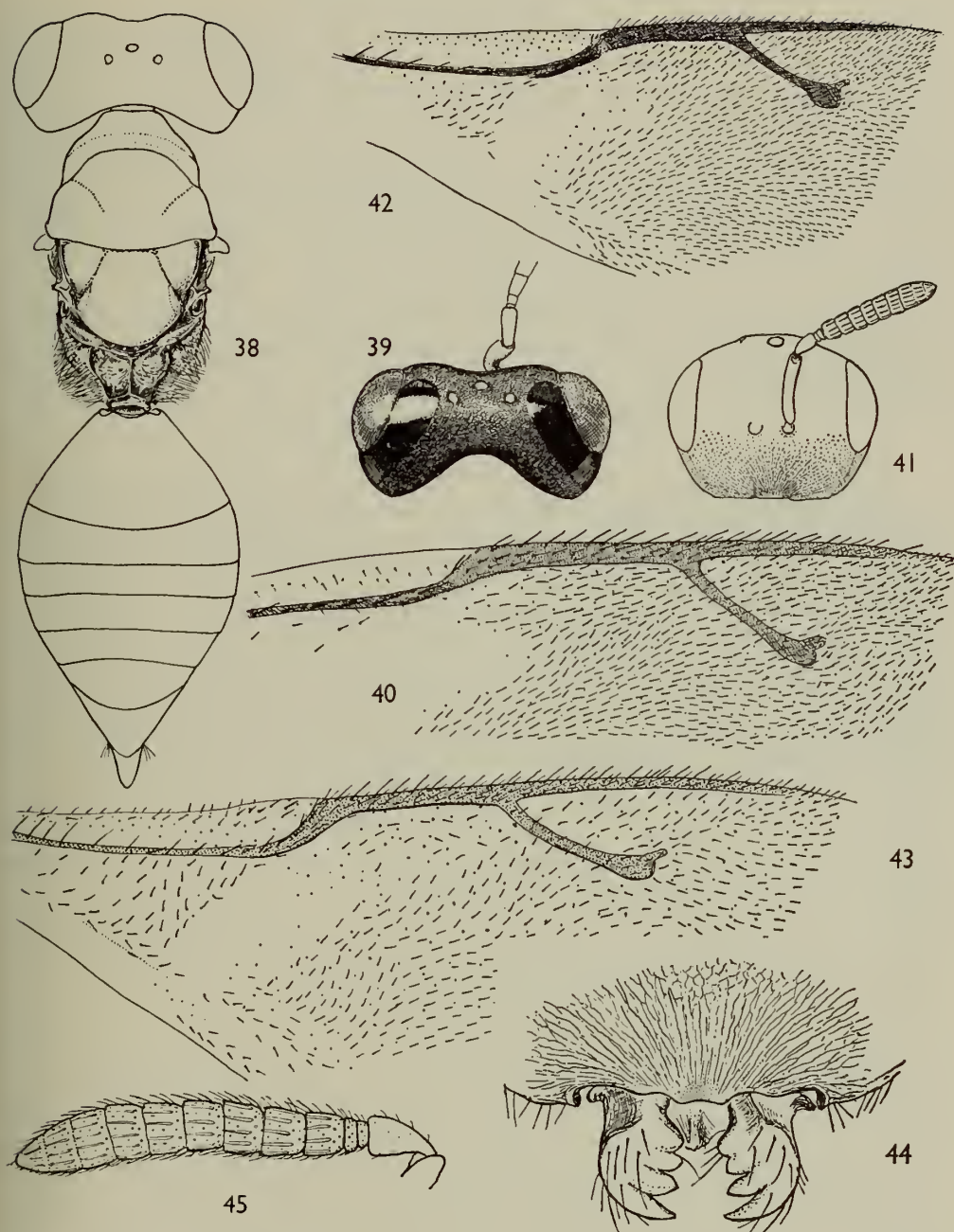
Pronotum with collar in middle about 1/8 the length of mesoscutum, its carinaceous anterior margin weakly arched, sides strongly diverging, slightly bulging posteriorly. Scutellum 1.1 times as long as maximum breadth less axillulae; frenum relatively shiny, its reticulation wide-meshed, obliterated; scutellar disc extremely densely reticulate, front margin meeting mesoscutum for one-quarter of mesoscutal breadth, as broadly as each axilla. Propodeum duller than disc of scutellum, in the middle less than one-third the length of scutellum; posterolateral corners rounded, with a small supracoxal flange. Fore wing broad (136 : 53), marginal vein 8.2–9.5 times as long as broad. Relative length of costal cell 46, marginal vein 22, postmarginal 24, stigmal vein 18 (Text-fig. 40).

Gaster 1.05–1.25 times as long as head plus thorax combined. First and second tergite in middle of hind margin sometimes submarginate, dorsally nearly smooth, the following tergites alutaceous basally. Weak pubescence on sides and apex of gaster dark.

♂. The two specimens available are unusually small, 1.6 mm. Head perhaps therefore relatively broader, 1.2 times as broad as mesoscutum. In colour very similar to female, but infumation of the fore wing weak. Flagellum plus pedicellus combined 0.86 the breadth of head; pedicellus dorsally scarcely 1.5 times as long as broad; all funicle segments distinctly transverse, clothed with semidistant hairs which are nearly as long as segments. Gaster hardly longer and much narrower than the thorax.

BIOLOGY. Reared from oak gall of the Cynipid *Andricus quercusradicis* (F.).

Holotype ♀. FRANCE: Côtes-du-Nord, Erquy-les-Bains (H. B. Preston); in BMNH.



FIGS 38-45. 38-40. *Peridesmia montana*. 38, body of ♀ with sculpture of propodeum indicated; 39, head of ♂; 40, part of fore wing of ♀. 41-42. *Rhizomalus cupreus*. 41, head of ♀ in facial view; 42, fore wing venation in ♀. 43-45. *Pteromalus paludicola*. 43, part of fore wing with venation and pilosity; 44, mouth region with mandibles; 45, ♀ flagellum with pedicellus.

Paratypes. BRITAIN: England, Oxfordshire, Bald Hill near Lewknor, 1 ♀, 15.vii.1960 (*Graham*); Graham Collection. CZECHOSLOVAKIA: Slovakia, Kováčov near Štúrovo, 1 ♀, 17.vii.1969 (*Bouček*). HUNGARY: Baja, ex gall of *Andricus quercusradicis*, 1 ♀, 6.viii.1961 (*Fekete*). YUGOSLAVIA: Dalmatia, Biograd na moru, 1 ♀, vii.1968 (*Bouček*). BULGARIA: Sandanski district, 3 ♀, vi.1969 (*Kocourek*). GREECE: Kalamaria near Thessaloniki, 4 ♀, 2 ♂ (one allotype), 1917 (*J. Waterston*), BMNH. Also 2 ♀ from the MOLDAVIAN S.S.R. (U.S.S.R.) examined but data not noted. Partly in Bouček Collection, partly in NM, Prague and BMNH, London.

PTEROMALUS Swederus

Pteromalus Swederus, 1795 : 201. Type-species: *Ichneumon puparum* Linnaeus; designated by Westwood, 1839.

Pteromalus paludicola sp. n.

(Text-figs 43-45)

♀. Bluish green; antennae blackish brown, scapes testaceous, infusate at apex; legs except metallic coxae mainly reddish testaceous, but femora mostly infusate, as well as fore tarsi and apex of mid and hind tarsi, sometimes also mid and hind tibiae infusate. Wings hyaline, venation brown. Length 1.8-2.2 mm.

Head about 1.28 times as broad as mesoscutum, dorsally about 2.15 times as broad as long, temples about half the length of the eyes, converging moderately and rather straight. POL about 1.1 times the OOL, the latter equals about 3 diameters of lateral ocellus. Head in facial view transversely subelliptic about 1.23 times as broad as high; lower face with clypeus distinctly radiately striate (Text-fig. 44), lower margin of clypeus shallowly emarginate, medially depressed. Mandibles clearly 4-toothed. Genae slightly swollen just at mouth margin which is depressed from below at mouth corners and bordered by a groove sublaterally (seen from below). Relative measurements; width of head 50, of frons 32, eye 22 : 16, malar space 12, width of mouth 21, distance between lower margin of clypeus and antennal toruli 15, scapus 17.5, flagellum plus pedicellus 38.5, i.e., about 0.75-0.8 the breadth of head. Scapus relatively short, not nearly reaching to ocellus; pedicellus dorsally about 1.5 times as long as broad, distinctly longer than first funicle segment (Text-fig. 45); the latter slightly transverse, the following segments more transverse, sixth funicle segment about 1.4 times as broad as long; clava ovate-subacuminate, about as long (0.95-1.04) as three preceding segments combined. Flagellum hardly to slightly clavate, each funicle segment with one row of sensilla.

Thorax about 1.5 times as long as broad, dull, densely punctured-reticulate, rather unusually densely clothed with dark short hairs (conspicuous in lateral view). Dorsum not flattened. Pronotum 0.82 times as broad and medially one-sixth to one-seventh as long, as mesoscutum. The latter 1.74 times as broad as long, on disc with reticulations as dense as on scutellum but elsewhere more finely reticulate. Scutellum rather flat, hardly as long as broad, frenum not distinctly marked off sculpturally. Propodeum half as long as scutellum; median carina indicated only basally; plicae posteriorly at base of nucha very low; hairs of callus partly dark, rather dense also behind spiracle; depressed part above hind coxa and behind callus rather short. Legs moderately stout, hind femur 4.5 times as long as broad, hind tibia about 1.2 times as long as hind tarsus. Fore wing (Text-fig. 40) unusually extensively hairy, basal cell hairy all over, speculum usually closed below or nearly, lower surface of costal cell even basally with double or triple row of hairs. Relative lengths of veins; marginal 21, postmarginal 25, stigmal 15; in a paratype $m : pm : st$ as 18 : 25 : 14.

Gaster about as long or slightly shorter than thorax, about 1.5-1.6 times as long as broad, dorsally depressed. Basal tergite occupying slightly less than one-third the total length.

♂. Not known.

BIOLOGY. Host not known. All specimens were collected in marshy habitats (hence also the specific name).

Holotype ♀. CZECHOSLOVAKIA: Bohemia, Řevničov, 14.viii.1958 (Bouček); presented to BMNH.

Paratypes. CZECHOSLOVAKIA: Bohemia, Břehyně near Doksy, 5 ♀, 17.vii.1963 (Bouček); partly in Bouček Collection, partly in NM, Prague.

Pteromalus paludicola sp. n. with its completely hairy basal cell can be easily separated from all the other European species of *Pteromalus* and *Habrocytus*, most of which are keyed in a combined key by Graham (1969 : 495–523). This character occurs otherwise only in some *Pteromalus venustus* Walker, as discussed by Bouček (1970 : 74) and, possibly, in the rather enigmatic *P. vopiscus* Walker (see Graham, 1969 : 492), which differs in having fairly convex scutellum. Otherwise both can be separated from *P. paludicola* as follows.

- 1 Length of flagellum plus pedicellus only 0.8 the width of head, all funicle segments transverse; clava about as long (0.95–1.04) as three preceding segments combined. Basal cell completely hairy, speculum mostly closed below *paludicola* sp. n. (p. 302)
- Flagellum plus pedicellus as long as 0.86–0.93 the width of head, proximal funicle segments not transverse; clava 1.24–1.3 the length of two preceding segments combined. Basal cell proximally bare, speculum open below.

venustus Walker and *vopiscus* Walker

Another species similar to *Pteromalus paludicola* sp. n. is *Habrocytus crassicornis* (Zetterstedt) occurring in Czechoslovakia in the same habitats. It has similarly hairy wings and short antennae, but the left mandible is 3-toothed, lower face strongly striate, scutellum strongly convex, venation different, etc.

PERIDESMIA Förster

Peridesmia Förster, 1856 : 65. Type-species: *Isocyrtus (Trichomalus) aquisgranensis* Mayr; designated by Gahan, 1923.

***Peridesmia montana* sp. n.**

(Text-figs. 38–40)

♀. Dark green, in places with bronzy or cupreous tinge; antennal scapes and pedicels as well as legs beyond coxae, testaceous; flagellum blackish. Wings subhyaline, venation testaceous. Length 2.8–3 mm.

Head fully 1.4 times as broad as mesoscutum (Text-fig. 38), in dorsal view 2.1 times as broad as long, with temples slightly less than one-third the length of compound eyes. POL 0.9–0.95 the OOL. Relative width of frons 37, width of head 64, eye 30.5 : 24, malar space 15.5, scapus 22. In facial view head 1.27–1.3 times as broad as high, with genae arched, strongly converging; mouth margin sublaterally strongly receding inward but distinctly produced at either side of clypeus. Flagellum plus pedicellus combined about 0.86 the width of head; pedicellus dorsally fully twice as long as broad; flagellum clavate, second anellus only slightly transverse; first funicle segment slightly broader than pedicellus, about 1.5 times as long as broad, the sixth about 0.75 times the breadth and 1.5 times as broad as pedicellus; clava subacuminate, as long as 2.5 preceding segments combined.

Thorax 1.6 times as long as broad, rather finely reticulate-punctured. Pronotum distinctly narrower than mesoscutum, as 38 : 45; collar indistinctly edged, in dorsal view sides diverging, not protruding. Mesoscutum about 1.8 times as broad as long, longitudinally moderately strongly convex. Scutellum fairly convex, as long as mesoscutum and slightly longer than its breadth measured posteriorly between axillulae. Propodeum medially 0.72 the length of scutellum; median carina and plicae very strong and high, plicae strongly sinuate; median area cordiform, fully 1.6 times as broad as long, its bottom rather shiny, with some obliquely diverging rugae and only traces of reticulation, in deeper parts nearly smooth, posteriorly delimited by highly carinaceous angulate edge of nuchal strip (Text-fig. 38); the strip in form of a low arched trapezoid, depressed and scarcely strigulose on disc, its sides subparallel, raised, nearly as long as the strip in the middle. Lateral parts of propodeum beyond spiracles and beyond posterior half of plicae densely hairy. *Fore wing* densely hairy on disc but nearly bare in basal third, with only a few short hairs near upper part of basal fold (Text-fig. 40); lower surface of costal cell with complete hair-row, partly doubled basally, double or triple distally. Relative lengths of veins: marginal 25, postmarginal 23, stigmal 17.

Gaster ovate-acuminate, depressed, slightly shorter than head plus thorax combined, broader than thorax but narrower than head. First tergite laterally densely hairy.

♂. In colour similar to female but more vividly cupreous on vertex and thoracic dorsum; the smooth strip on head (Text-fig. 39) blackish purple. Antennal flagellum dark testaceous except for blackish distal third. Length 2.5 mm.

Head very stout, 1.6 times as broad as mesoscutum and dorsally 1.9 times as broad as long, with the smooth strip very broad and long, touching the eyes and extending from the mouth corner up on temples and vertex forward to upper frons. POL about 0.8 the OOL. Antennae only slightly more slender than in female, flagellum plus pedicellus combined 0.8 the breadth of head, second anellus subquadrate, distal funicle segments subquadrate. Propodeum with median area still more shiny, with more distinct but sparser rugae, the reticulation traceable only on the disc; nuchal strip narrower than in female, its hind margin more raised. Gaster weakly convex, about three-fourths the length of thorax; first tergite covering one-half.

BIOLOGY not known. All three specimens were collected by sweeping grass on montane meadows.

Holotype ♀. CZECHOSLOVAKIA: Slovakia, Remetské Hámre, 10.vii.1960 (*Strejček*); in Bouček Collection.

Paratypes. CZECHOSLOVAKIA: Bohemia, Krkonoše Mts, Dolní Malá Úpa, 1 ♀, 8.ix.1968 (*Bouček*); Slovakia, Ulič-Stionka, 1 ♂ (allotype), 18.viii.1957 (*L. Masner*).

Two European species were previously known and the new species may be separated from them mainly on the following characters.

- 1 Median area of propodeum in both sexes rather shiny, with some diverging rugae, nearly smooth posteriorly in the depression in front of nuchal strip; the latter trapezoidal, its highly carinaceous sides hardly shorter than length of the strip in the middle. ♂: smooth strip behind eyes very broad, reaching from mouth over temples and vertex forward on frons beyond level of front edge of median ocellus, dorsally strip as broad as POL.
Pronotum distinctly narrower than the mesoscutum. Length of body 2.3–3 mm *montana* sp. n. (p. 303)
- Median area of propodeum dull, punctured-reticulate; nucha either not set off posteriorly by a sharp cross-carina (*P. congrua*) or the nuchal strip is in form of a low triangle and pronotum is scarcely narrower than mesoscutum (*P. discus*). In ♂ the smooth postocular strip either much shorter or, if reaching vertex, much narrower than above 2

- 2 (1) For separation of *P. congrua* and *P. discus* see Graham (1969 : 701).

Both *Peridesmia congrua* (Walker) and *P. discus* (Walker) are not uncommon in Czechoslovakia, but no new information on their biology is available. *P. discus* is known to me also from YUGOSLAVIA: Kopaonik Mts, Milanov Vrh, 24.viii.1958 (Janković).

SPANIOPUS Walker

(Text-figs 46–55)

Spaniopus Walker, 1833 : 466. Type-species: *Spaniopus dissimilis* Walker, by monotypy.

For synonymy and references see Graham, 1969.

Graham (1969 : 702–707) keyed out females of two species and males of four species. The mostly fresh material at my disposal contains seven European species, two of which have proved new to science.

KEY TO EUROPEAN SPECIES

Females

- 1 Eyes relatively small; in facial view width of frons about twice the height of eye, about equal to height of head (Text-fig. 58). Fore wing usually with several dispersed spots (Text-fig. 57); marginal vein about twice as long as the stigmal *polyspilus* Graham (p. 307)
- Eyes larger; frons in facial view distinctly narrower than height of head. Fore wing markings otherwise or missing; marginal vein only rarely twice as long as the stigmal, mostly shorter 2
- 2 (1) Body relatively slender; thorax 1.6–1.67 times as long (from anterior edge of collar) as breadth of mesoscutum; gaster 1.72–2.1 times as long as broad, sublanceolate, sides of sixth tergite converging at an angle less than 50°. Notauli distinct as impressed lines along about 3/4 of mesoscutum. Fore wing usually with one lunate macula below (but not touching) stigmal vein (Text-fig. 62), sometimes with another faint subapical spot. Associated with *Phragmites* *peisonis* (Erdős) (p. 307)
- Body stouter; thorax 1.45–1.57 times as long as broad; gaster shorter, ovate-acuminate, sides of sixth tergite converging at an angle of about 60° or more. Notauli not reaching beyond 0.6 along mesoscutum. Fore wing, if spots distinct, differently marked. Probably never associated with *Phragmites* 3
- 3 (2) Antennal pedicellus dorsally fully twice as long as broad, first funicle segment fully 1.5 times as long as broad and distinctly constricted basally; whole antenna fulvous. Marginal vein often more than 1.75 times as long as the stigmal vein. Fore wing, if infumate, with a broad cloud below marginal and stigmal vein 4
- Pedicellus at most 1.8 times as long as broad, first funicle segment at most 1.3 times as long as broad, differing little in length from distal funicle segments; flagellum at least partly fuscous. Marginal vein at most 1.75 times as long as the stigmal vein. Fore wing markings different (or missing) 5

- 4 (3) Fifth funicle segment subquadrate, the sixth subtransverse; flagellum less strongly clavate, combined with pedicellus about as long as width of head. Fore wings larger, distinctly exceeding apex of gaster; marginal vein about 1.75 times as long as the stigmal, about 1.5 times as long as the postmarginal which is strongly tapering apically; angle between inner margins of postmarginal and stigmal veins about 50° . . . *monospilus* (Thomson) (p. 310)
- Fifth and sixth funicle segments considerably transverse, flagellum more clavate (Text-fig. 49), its length combined with pedicellus only about 0.9 times the width of head. Fore wing smaller, about reaching apex of gaster; marginal vein about twice as long as the stigmal, about 1.8 times as long as the postmarginal, the latter vein rather broad; angle between the two veins relatively broader (Text-fig. 51) . . . *fulvicornis* sp. n. (p. 309)
- 5 (3) Basal cell of fore wing extensively hairy. Funicle segments subequal in length, the third and fourth fuscous, the others yellowish; cava infusate. In the only known female wings hyaline, but similar infumation as in male holotype, broadly appended to the veins, may be expected . . . *varicornis* sp. n. (p. 310)
- Basal cell bare but sometimes bordered distally with a few hairs on basal and cubital fold. Funicle segments more distinctly decreasing in length, the distal ones never paler than the middle ones. Fore wing, if clouded, on the disc with an obliquely oval spot, not touching the veins . . . 6
- 6 (5) Flagellum all fuscous or hardly paler basally, very weakly clavate. . . *dissimilis* Walker (p. 313)
- Funicle segments 1-4 usually paler brown, apex of flagellum blackish and slightly more clavate than above . . . *amoenus* Förster (p. 312)

Males

- 1 Mid tibia at least partly infusate and more or less broadened, flattened (Text-figs 56, 60, 61) . . . 2
- Mid tibia all yellow and not distinctly enlarged . . . 5
- 2 (1) Funicle segments alternately small and large (Text-fig. 47), the large ones partly brown, the small ones mainly pale yellow. Genae in facial view with a long comb of long white hairs (Text-fig. 46). Mid tibia with a broad external lobe (Text-fig. 56) . . . *monospilus* (Thomson) (p. 310)
- Funicle segments hardly different in width, not alternating in colour. Genae with shorter hairs. Mid tibia more gradually broadened distally . . . 3
- 3 (2) Funicle segments 3 and 4 and clava distinctly infusate, whilst funicle segments 1-2 and 5-6 are yellow (Text-fig. 54). Flattening of mid tibia forms two waves on inner edge and one wave subapically on the outer edge (Text-fig. 61). Fore wing extensively infusate in the middle, infuscation adhering broadly to marginal and stigmal vein . . . *varicornis* sp. n. (p. 310)
- Distal funicle segments not paler-coloured than the middle ones. Mid tibia on inner side enlarged in a simple curve or almost straight. Fore wing infuscation, if present, less extensive and not adhering to the veins . . . 4
- 4 (3) Flagellum slender-filiform, along with pedicellus uniformly brownish testaceous (Text-fig. 55), distinctly darker than the pale yellow scape. Gena below with outstanding hairs which are about twice as long as the hairs on face below antennae. Mid tibia in dorsal view with inner side all blackish, more broadly flattened than the outer side. Eye longer than scapus. *dissimilis* Walker (p. 313)

- Flagellum subclavate, basally pale yellow, funicle segments 5 and 6 and clava fuscous. Gena below only with normal hairs which are subequal to those on lower face. Mid tibia in dorsal view with only the outer side flattened, the inner side usually with a pale line throughout (Text-fig. 60). Eye about as long as scapus *amoenus* Förster (p. 312)
- 5 (1) Head more strongly transverse than in the alternate
Here probably the unknown male of *S. polyspilus* Graham
- Head in dorsal view 1.78-1.96 times as broad as long, in facial view 1.21-1.29 times as broad as high 6
- 6 (5) Fifth and sixth funicle segment subquadrate (Text-fig. 50); flagellum hardly longer than width of head, its segments uniformly flavous. Eye about 1.25 times as long as broad, about 1.8 times as long as malar space. Scapus in lateral view hardly broader than the funicle. Thorax fairly arched dorsally. Apex of basal cell of fore wing more or less hairy. Possibly not associated with *Phragmites* *fulvicornis* sp. n. (p. 319)
- Fifth and sixth funicle segment distinctly elongate; flagellum itself about 1.1 times as long as width of head, funicle segments partly and rather irregularly pale testaceous and partly brownish; scapus in side view at least 1.3 times as broad as the funicle. Thorax very weakly arched dorsally. Basal cell of fore wing bare. Associated with *Phragmites* *peisonis* (Erdös) (p. 317)

Spaniopus polyspilus Graham

(Text-figs 52, 57-59)

[*Polycelis conspersa* (Walker); Thomson, 1878 : 143-144. Misidentification.]

Spaniopus polyspilus Graham, 1956 : 251. Holotype ♀, SWEDEN: Stockholm (UZI, Lund) [examined]. [Proposed as new name for *Polycelis conspersa* (Walker) sensu Thomson, 1878.]

This species is not conspecific with *Spaniopus peisonis* (Erdös) as Graham (1969) assumed, but a valid species the main characters of which are given in the key above.

BIOLOGY still unknown.

Known so far only from SWEDEN (Thomson's specimens).

Spaniopus peisonis (Erdös)

(Text-figs 53, 62)

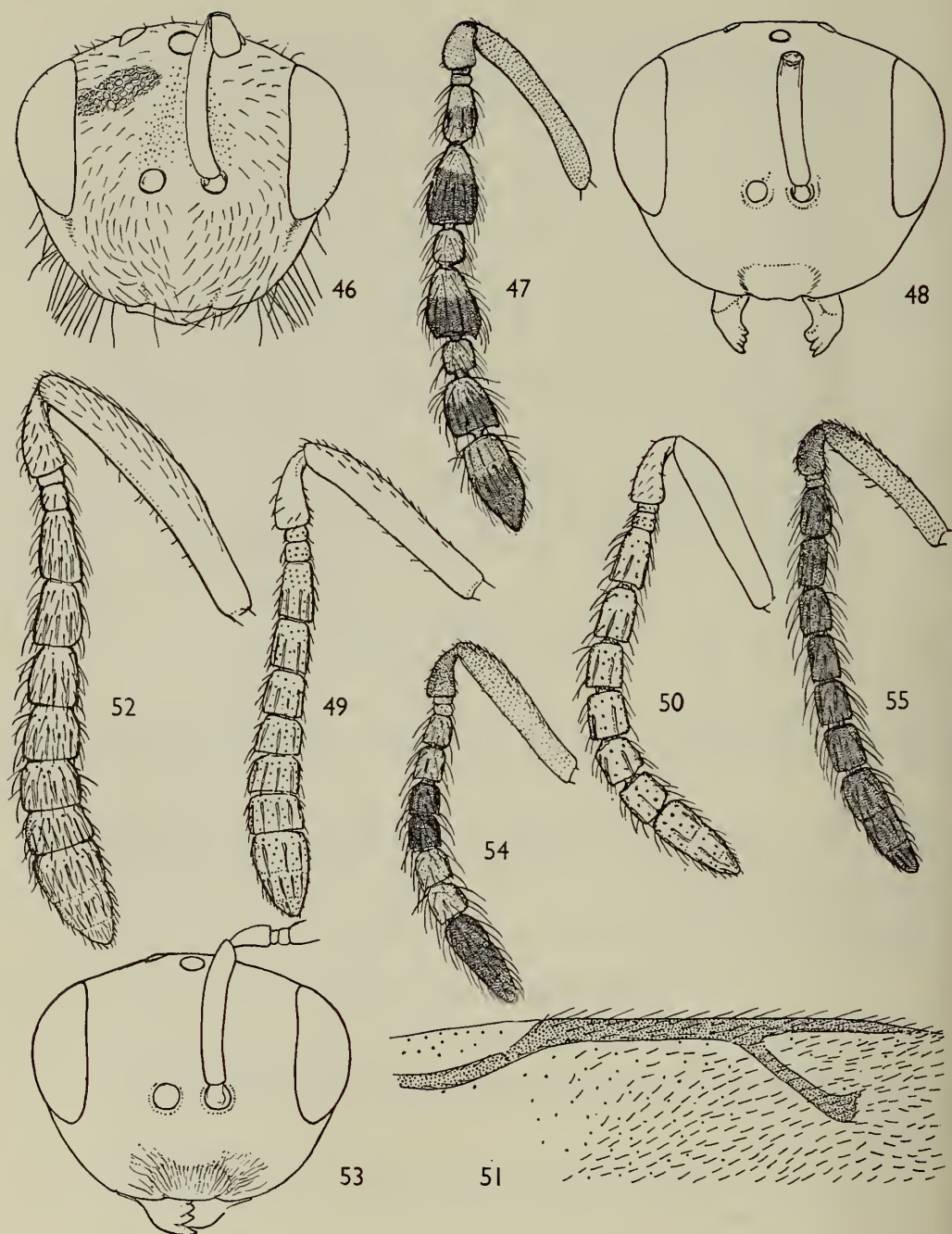
[*Polycelis monospila* Thomson, 1878 : 145, ex parte (only ♀, not the lectotype).]

Gyrinophagus peisonis Erdös, 1957 : 64, ♂♀. Holotype ♀, HUNGARY: Vörs (TM, Budapest) [examined].

I examined the Hungarian material including the holotype several years ago in Dr Erdös' collection.

BIOLOGY. Parasite in the galls of *Giraudiella inclusa* (Frauenfeld) (Dipt., Cecidomyiidae) on *Phragmites communis* Trin.

DISTRIBUTION. Britain, Sweden, Czechoslovakia, Hungary.



FIGS 46-55. *Spaniopus*. 46-47. *S. monospilus*. 46, ♂ head; 47, ♂ antenna. 48-51. *S. fulvicornis*. 48, ♀ head; 49, ♀ antenna; 50, ♂ antenna; 51, fore wing venation in ♀. 52. *S. polyspilus*, ♀ antenna. 53. *S. peisonis*, ♀ head. 54. *S. varicornis*, ♂ antenna. 55. *S. dissimilis*. ♂ antenna.

MATERIAL EXAMINED.

Type-data given in synonymy.

SWEDEN: Småland, 3 ♀ paralectotypes of *P. monospila* Thomson (*Boheman*); coll. Thomson, UZI, Lund; Skåne, Yddingen, 1 ♀ (*Graham*); Graham Coll. CZECHOSLOVAKIA: Bohemia, Břehyně near Doksy, 3 ♀, 17.vii.1963 (*Bouček*); Kokořín, ex *Giraudiella inclusa*, 2 ♂, vi.1958 (*M. Skuhravá*); Týniště nad Orlicí, 3 ♂, 16 ♀, viii.1959, 1 ♂, 23.vii.1955 (*Bouček*); Soběslav, 14 ♀, 22.vii.1955 (*Hoffer*); Moravia, Branišovice S. of Brno, 1 ♀, 29.v.1956 (*Bouček*); Slovakia, Turna nad Bodvou, 1 ♀, 23.iv.1952 (*Bouček*).

Spaniopus fulvicornis sp. n.

(Text-figs 48–51)

♀. Metallic green, on vertex and thoracic dorsum slightly merging with dark cupreous, gaster darker green; antenna testaceous, apically often slightly darker than basally, also pedicellus sometimes slightly infuscate; legs testaceous but coxae basally mainly dark and with metallic tinge, apex of tarsi infuscate. Wings hyaline but fore wing usually with fuscous cloud attached broadly to marginal and stigmal vein; venation testaceous. Length 1.9–2.9 (holotype 2.6) mm.

Head dorsally fully twice as broad as long (49 : 24), 1.24 times as broad as mesoscutum and 1.49 times as broad as pronotum; temple about one-third length of eye in dorsal view. POL to OOL as 4 : 3. Relative measurements: breadth of head 49, height 40, breadth of frons 33, eye 24 : 17, malar space 13, width of mouth 23, scapus length 20.5, flagellum plus pedicellus 43, i.e., 0.88 the breadth of head. Left mandible 3, right 4 teeth. Clypeus and lower face densely radiately striate, lower margin of clypeus subemarginate. Scapus not quite reaching vertex level, slender, bent (Text-fig. 49). Pedicellus dorsally 2–2.1 times as long as broad; second anellus only slightly transverse (as in *S. polyspilus*); funicle segments distinctly decreasing in length and increasing in width, the first in some views narrower than pedicellus and about 1.5 times as long as broad, the sixth in lateral view 1.5 times as broad as pedicellus and 1.5 times as broad as long; clava barely longer than two preceding segments combined.

Length of thorax measured from anterior edge of collar 1.53 times the breadth of mesoscutum. Collar moderately sloping, medially 0.22 the length of mesoscutum. Scutellum with rather deep reticulation-puncturation. Propodeum medially two-thirds the length of scutellum, nucha taking up posterior 3/7; median area rather dull, irregularly reticulate-punctured, as broad as median length of propodeum. Plicae distinct, almost regularly arcuate; part beyond plicae densely clothed with white hairs, except area around spiracle. Upper mesepimeron smooth. Hind femur 4.5 times as long as broad. *Fore wing*: relative lengths of veins: marginal 22, postmarginal 13, stigmal vein 11, the latter at a relatively wide angle (Text-fig. 51). Basal cell with adjoining folds bare, basal fold sometimes with 1–2 hairs; lower surface of costal cell basally with single hair-line.

Gaster barely as long as head plus thorax combined, ovate-acuminate, itself 1.66–1.85 times as long as broad, sides of sixth tergite converging at about 60°.

♂. Similar to female in colour and in form of thorax. Antennae and legs yellowish testaceous. Scapus slightly exceeding vertex level, as long as eye (in one specimen slightly shorter than eye). Flagellum (Text-fig. 50) plus pedicellus about 1.1 times as long as head width; pedicellus dorsally 1.8 times as long as broad; flagellum feebly clavate, unicolorous, first funicle segment about 1.5 times as long as broad, the sixth subquadrate; clava about 2.5 times as long as broad, subacuminate. Genae without outstanding hairs. Mid tibia simple and not infuscate. *Fore wing* subhyaline, with basal cell slightly hairy in distal part; marginal vein about 1.8 times (1.75–1.89 times) as long as the stigmal. Gaster slightly longer than half length of thorax. Length of body 1.5–1.6 mm.

BIOLOGY unknown. Probably a grass-dweller.

Holotype ♀. CZECHOSLOVAKIA: Bohemia, Sedlo Hill near Litoměřice, 6.viii.1964 (*Bouček*); presented to BMNH, London.

Paratypes. CZECHOSLOVAKIA: Bohemia, Mt. Děčínský Sněžník, 2 ♀, 1 ♂, 27.vii.1956 (*Bouček*); Bělá near Děčín, 3 ♀, 2 ♂ (one of them allotype), 20.viii.1956 (*Bouček*); Břehyně near Doksy, 1 ♀, 21.vii.1963 (*Strejček*); Jedlová Mt., near Rumburk, 1 ♀, 8.v.1960 (*Bouček*); Slovakia, Smokovec, High Tatra Mts, 1 ♀, 21.viii.1958 (*Bouček*). Paratypes partly in NM, Prague, partly in Bouček Collection.

Spaniopus monospilus (Thomson)

(Text-figs 46, 47, 56)

Polycelis monospila Thomson, 1878 : 145. Lectotype ♂, SWEDEN: Kinekülle (UZI, Lund) [examined].

Polyscelis Websteri Ashmead, 1894: 52-53, ♀♂. Holotype ♀, U.S.A.: Indiana, Lafayette (USNM, Washington) [examined]. **Syn. n.**

P. websteri is a synonym of *S. monospilus* as Graham (1969 : 706) has already suggested. In October 1970 I showed the very distinctive lectotype male of *monospilus* to Dr Burks and he agreed with the synonymy. More recently he kindly sent to me for examination the holotype of *websteri*. Because the females referred to *S. monospilus* by Thomson proved to belong to *S. peisonis* (see under that species), the holotype of *websteri* is the only known female of the present species. Its characters are included in the key above.

BIOLOGY not known with certainty. *P. websteri* was recorded from a Cynipid gall on *Lactuca canadensis* (Peck, 1963), which seems doubtful (Dr B. D. Burks, personal communication).

DISTRIBUTION: Sweden (only 2 males); U.S.A.

Spaniopus varicornis sp. n.

(Text-figs 54, 61)

♀. Mainly metallic green, but vertex dark purple to violaceous or bronzy, thoracic dorsum with dull cupreous to bronzy tinge, gaster bluish green with bright green base. Antenna testaceous with funicle segments 3 and 4 fuscous; weakly infusate, mainly dorsally, are also pedicellus, second and fifth funicle segment; clava fuscous. Wings hyaline, venation testaceous. Length 2 mm.

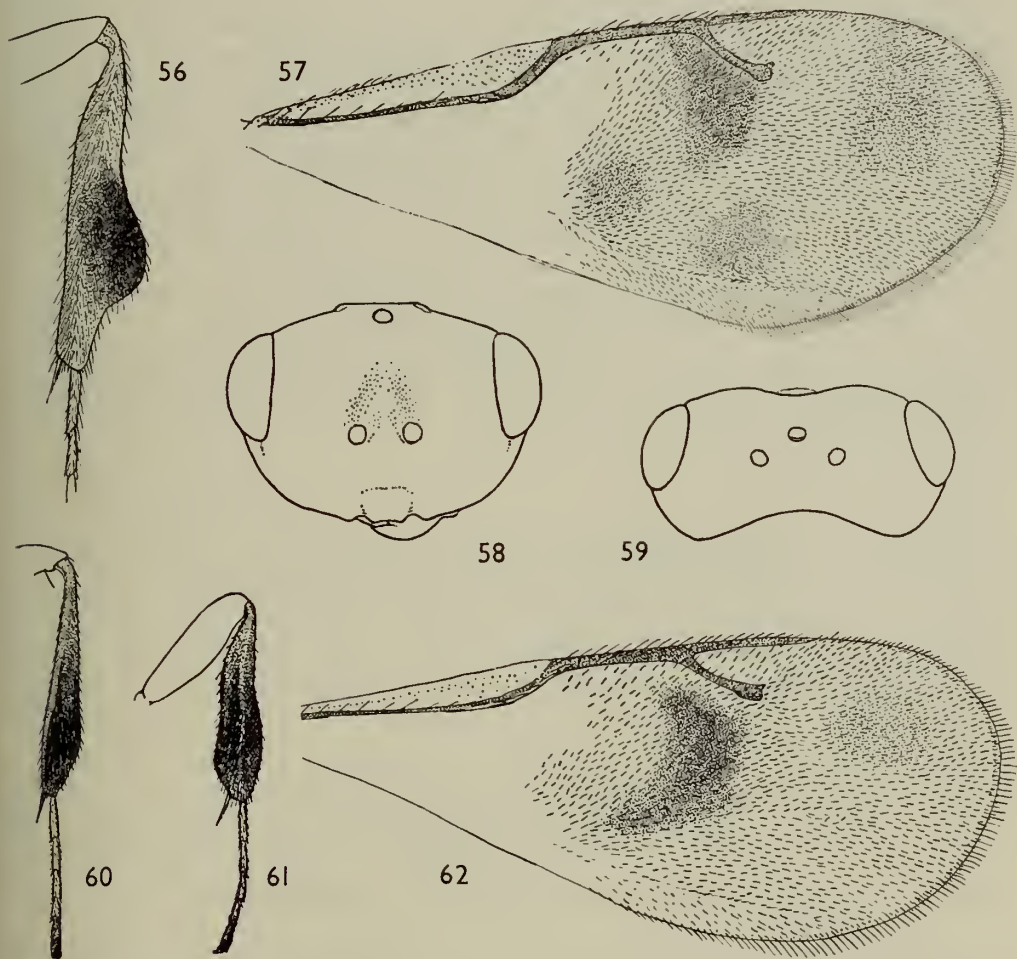
Head dorsally twice as broad as long, 1.26 times as broad as mesoscutum 1.53 times as broad as pronotum; temple one-third the length of eye. POL 1.4 times the OOL. In facial view head 1.26 times as broad as high, with genae strongly converging (at about 120°). Lower face very distinctly radiately striate, lower margin of clypeus shallowly depressed, subemarginate. Scapus reaching to level with anterior edge of median ocellus; pedicellus dorsally about 1.8 times as long as broad; flagellum plus pedicellus as long as 0.9 the breadth of head; both anelli together about as long as broad; flagellum in lateral view slightly clavate, clothed with semi-erect hairs almost half as long as segments; all funicle segments subequal in lengths, in lateral

view the first slightly elongate, the sixth slightly transverse; clava fully twice as long as broad.

Thorax almost as in male. Legs normal, not very slender, hind femur about 4.3 times as long as broad, hind tarsus 0.7 the length of tibia. *Fore wing* with basal cell extensively hairy. Relative lengths of veins: marginal 12.5, postmarginal 12, stigmal vein 11.

Gaster ovate-pointed, slightly longer than thorax, itself 1.62 times as long as broad; in dorsal view sides of sixth tergite converging at angle of about 80° .

♂. Bright green with weak brassy reflections on frons and thoracic dorsum. Antenna pale yellow, but funicle segments 3 and 4 fuscous; apex of scapus, pedicellus and clava except apex also infusate (Text-fig. 54). Tegulae and legs including coxae pale testaceous, but mid



FIGS 56-62. *Spaniopus*. 56. *S. monospilus*, mid tibia in ♂. 57-59. *S. polyspilus*. 57, fore wing in ♀; 58 & 59, ♀ head in facial and dorsal view. 60. *S. amoenus*, mid tibia of ♂. 61. *S. varicornis*, mid tibia of ♂. 62. *S. peisonis*, fore wing of ♀ with well developed markings.

tibia fuscous except basally (Text-fig. 61). Fore wing with broad brownish cloud attached to marginal and stigmal vein. Length 1.6 mm.

Head dorsally 1.91 times as broad as long, eye 3.3 times as long as temple; POL 1.5 times the OOL. In facial view head 1.24 times as broad as high. Lower face more distinctly, clypeus more finely and shallowly, radiately striate, in middle below smooth; lower margin submarginate. Mandibles: left 3, right 4 teeth. Genae arched, strongly converging, below with group of erect white hairs of medium length. Relative measurements: breadth of head 34, frons 22, eye 17.2 : 13, malar space 7, width of mouth 15.4, length of scape 15.5, flagellum plus pedicellus about 46, i.e., 1.36 times the breadth of head. Pedicellus dorsally 1.7 times as long as broad; both anelli transverse, together hardly as long as broad; funicle segments (Text-fig. 54) subequal in length, hardly increasing in breadth, the basal ones inconspicuously longer than broad, the distal ones subquadrate; clava slightly shorter than three preceding segments together; flagellum with semidistant hairs slightly shorter than segments.

Pronotum moderately narrower than mesoscutum, rather deeply emarginate posteriorly, collar anteriorly angulate, in middle about 1/6 the length of mesoscutum. The latter hardly more than 1.5 times as broad as long; notauli fading out in the middle. Propodeum 0.78 the length of scutellum, median area about 1.1 times as broad as long, anteriorly less coarsely more than 1.5 times as broad as long; notauli fading out in the middle. Propodeum 0.78 the reticulate than on nucha. Plicae distinct but not sharp; small oval spiracle nearly two diameters from metanotal margin; lateral part of propodeum beyond spiracle and beyond posterior half of plica densely hairy. Legs rather strong: femora slightly thickened, also fore tibia which is in side view only 5.3 times as long as broad. Mid tibia (Text-fig. 61) flattened, in dorsal view externally enlarged only in distal half, internally both in basal and distal halves, in outline there forming double curve. Mid femur 4 times as long as broad. Fore wing with basal cell hairy all over. Relative lengths of veins: marginal 15, postmarginal 12, stigmal 9.5.

Gaster subrotund, broader and shorter than thorax. Petiole conspicuous, smooth, in middle slightly broader than long, sides anteriorly parallel. First tergite covering more than half of gaster, its hind margin arcuate.

BIOLOGY not known.

Holotype ♂. CZECHOSLOVAKIA: Slovakia, Smokovec in High Tatra Mts, 29.viii.1958 (Bouček); in Bouček Collection.

Paratype. CZECHOSLOVAKIA: Bohemia, Týniště nad Orlicí, 1 ♀ (allotype), 12.ix.1959 (Hoffer); in Graham Collection.

The absence of the fore wing infumation in the allotype may be due to the subterrenal condition of the specimen.

Spaniopus amoenus Förster

(Text-fig. 60)

Spaniopus amoenus Förster, 1856 : 56. Type ♂, GERMANY: ?Aachen (?lost).

The type-material is probably lost but the short description fits the fresh material well. The female was not then known. It is extremely similar to that of *Spaniopus dissimilis* Walker and except for the colour of the antenna in most specimens (which, however, does not always seem to be reliable) I cannot find any additional character. Various parts of the body which are likely to yield some difference were measured and show a rather wide range of variation. Length of scape in relation

to the long eye diameter varies from 0.91–1.0 (: 1), while in *S. dissimilis* the same relation shows figures between 0.85 and 0.93. Similar overlap has been found in the relative length of malar space and of the veins in the fore wing. Length of body 1.8–2.4 mm.

BIOLOGY not known, but the species seems to be associated with grasses in xerothermic habitats.

DISTRIBUTION. France, W. and E. Germany, Czechoslovakia, Hungary.

MATERIAL EXAMINED.

FRANCE: Finisterre, Huelgoat, 2 ♀, 29.v.1954 (*J. F. Perkins*), in BMNH. E. GERMANY: Dresden district, 1 ♂, 16.ix.1965 (*Strejček*). CZECHOSLOVAKIA: Bohemia, Džbán Hill, 3 ♀, 2 ♂, 4.ix.1966 (*Bouček*); Velký Vřeštov, 1 ♂, viii.1961 (*Bouček*); Slovakia, Slanec, incl. Lake Izra and Helmec Valley, 6 ♀, 1 ♂, 3.–6.viii.1954 (*Bouček* & *Dlabola*). HUNGARY: Mecsek Hills, Misina, sifting under heath, about 80 ♀ and several ♂♂, 24.x.1953 (*Kasza*); Budapest-Hüvösvölgy, 1 ♀, 2 ♂, vi.–ix.1927 (*Biró*), the Hungarian material mostly in TM, Budapest.

Spaniopus dissimilis Walker

(Text-fig. 55)

Spaniopus dissimilis Walker, 1833 : 466. Holotype ♂, BRITAIN: near London (BMNH) [examined].

Spaniopus elegans Förster, 1856 : 56. Holotype ♂, W. GERMANY: (?) Aachen (?lost). **Syn. n.** *Polyscelis modestus* Gahan, 1922 : 11–12, ♀♂. Holotype ♀, U.S.A.: Pennsylvania, Hannover (USNM, Washington).

Graham (1969 : 705) is probably right in regarding *P. modestus* as a synonym of *S. dissimilis*, although the figure 16D in Gahan, 1933, shows the mid tibia of the male a little too slender. From the material examined I conclude that also *S. elegans* Förster, although its type seems to be lost, must be the same species. The flagellum of the male is usually brownish, but sometimes paler, yellowish, as described for *S. elegans*.

BIOLOGY. Solitary ectoparasite of *Mayetiola destructor* (Say) (Dipt., Cecidomyiidae) in grass stems, including wheat; mostly primary, rarely secondary (Gahan, 1922, 1933). According to my experience, unlike the closely related *S. amoenus*, *S. dissimilis* is not associated with xerothermic habitats.

DISTRIBUTION. Ireland, Britain, Sweden, Czechoslovakia; Canada, U.S.A.

NEW RECORDS.

BRITAIN: Ross-shire, Black Isle, 1 ♀, vii.1951 (*N. Hussey*). SWEDEN: Skåne, Fjellfota sjö, 1 ♀, 1 ♂, 31.vii.1938 (*J. F. Perkins*); Degaberga, 1 ♂, 8.vii.1938 (*D. M. S. P. & J. F. P.*); both in BMNH. CZECHOSLOVAKIA: Bohemia: Bělá near Děčín, 1 ♂, 14.vi.1957 (*Bouček*); Břehyně near Doksy, 2 ♀, 1 ♂, 12.vii.1959 (*Bouček*); Týniště nad Orlicí, 1 ♂, 23.vii.1955 (*Bouček*); partly in NM, Prague.

REFERENCES

- ASHMEAD, W. H. 1894. Descriptions of thirteen new parasitic Hymenoptera, bred by Prof. F. M. Webster. *J. Cincinn. Soc. nat. Hist.* **17** : 45-55, 2 pls.
- BOUČEK, Z. 1958. Eine Cleonyminen-Studie; Bestimmungstabelle der Gattungen mit Beschreibungen und Notizen, eingeschlossen einige Eupelmidae (Hym. Chalcidoidea). *Sb. ent. Odd. nář. Mus. Praze* **32** : 353-386, 40 figs.
- 1965. Some interesting records of Chalcid flies from Great Britain, with the description of *Bugacia classeyi* n. sp. (Hymenoptera: Pteromalidae). *Entomologist's Gaz.* **16** : 83-86, 4 figs.
- 1970. Contribution to the knowledge of Italian Chalcidoidea (Hym.) based mainly on a study at the Institute of Entomology in Turin, with descriptions of some new European species. *Mem. Soc. ent. ital.* **49** : 35-102, 16 figs.
- ERDŐS, J. 1953. Pteromalidae hungaricae novae. *Acta biol. hung.* **4** : 221-247, 11 figs.
- 1957. Recentiores observationes entomocoenologicae in Phragmite communi Trin. [In Hungarian and Latin]. *Allat. Közl.* **46** : 49-65, 7 figs.
- FABRICIUS, J. C. 1798. *Supplementum Entomologiae systematicae*. 572 pp. Copenhagen.
- FÖRSTER, A. 1856. *Hymenopterologische Studien. 2. Chalcididae und Proctotrupii*. 152 pp. Aachen.
- GAHAN, A. B. 1922. Descriptions of miscellaneous new reared parasitic Hymenoptera. *Proc. U.S. natn. Mus.* **61** : 1-24, 1 pl.
- 1933. The Serphoid and Chalcidoid parasites of the Hessian fly. *Misc. Publs U.S. Dep. Agric.* **174** : 1-147, 32 figs.
- GRAHAM, M. W. R. DE V. 1956. A revision of the Walker types of Pteromalidae (Hym., Chalcidoidea). Part 2 (including descriptions of new genera and species). *Entomologist's mon. Mag.* **92** : 246-263, 6 figs.
- 1969. The Pteromalidae of north-western Europe (Hymenoptera: Chalcidoidea). *Bull. Br. Mus. nat. Hist. (Ent.) Suppl.* **16** : 1-908.
- KERRICH, G. J. & GRAHAM, M. W. R. DE V. 1957. Systematic notes on British and Swedish Cleonymidae, with description of a new genus (Hym., Chalcidoidea). *Trans. Soc. Brit. Ent.* **12** : 265-311, 2 pls, 24 figs.
- KRYGER, J. P. 1943. The Chalcid subfamily Eunotinae. *Ent. Meddr* **23** : 66-81, 6 figs.
- KURDJUMOV, N. V. 1912. Six new species of Chalcid flies parasitic upon *Eriococcus greeni* Newstead. *Russk. ent. Obozr.* **12** : 329-335, 8 figs.
- LATREILLE, P. A. 1809. *Genera Crustaceorum et Insectorum*. **4**, 399 pp. Paris & Strasbourg.
- MASI, L. 1907. Contribuzioni alla conoscenza dei Calcididi italiani. *Boll. Lab. Zool. gen. agr. R. Scuola Agric. Portici* **1** : 231-295, 47 figs.
- 1928. Diagnosi di una nuova specie di *Eunotus* (Hymen. Chalcididae). *Boll. Soc. ent. ital.* **60** : 128.
- 1931. Contributo alla sistematica degli Eunotini (Hym. Chalc.). *Eos, Madr.* **7** : 411-459, 6 figs.
- NIKOLSKAYA, M. N. & KYAO, N. N. 1954. [Chalcid fauna of the middle course of the river Ural and its economic importance.] [In Russian]. *Trudy zool. Inst. Leningr.* **16** : 404-416, 6 figs.
- PECK, O. 1963. A Catalogue of the Nearctic Chalcidoidea (Insecta: Hymenoptera). *Can. Ent., Suppl.* **30**. 1092 pp.
- PECK, O., BOUČEK, Z. & HOFFER, A. 1964. Keys to the Chalcidoidea of Czechoslovakia (Insecta: Hymenoptera). *Mem. ent. Soc. Can.* no. **34**. 121 pp., 289 figs.
- RATZBURG, J. T. C. 1852. *Die Ichneumoniden der Forstinsecten in forstlicher und entomologischer Beziehung, ein Anhang zur Abbildung und Beschreibung der Forstinsecten*. **3**. vi-xviii+272 pp., 3 tables. Berlin.

- SWEDERUS, N. S. 1795. Beskrifning på et nytt genus *Pteromalus* ibland Insecterna, hoerande til Hymenoptera. *K. svenska Vetensk.Akad. Handl.* **16** : 201-205, 216-222.
- THOMSON, C. G. 1878. *Hymenoptera Scandinaviae*. **5**. *Pteromalus* (Svederus) continuatio. 307 pp., 1 pl. Lund.
- WALKER, F. 1833. Monographia Chalcidum. *Ent. Mag.* **1** : 367-384, 455-466.
- 1834. Monographia Chalciditum. *Ent. Mag.* **2** : 148-179, 286-309, 340-369
- 1837. Monographia Chalciditum. *Ent. Mag.* **4** : 349-358.
- WESTWOOD, J. O. 1839. *Synopsis of the genera of British insects*. Pp. 49-80. London.

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